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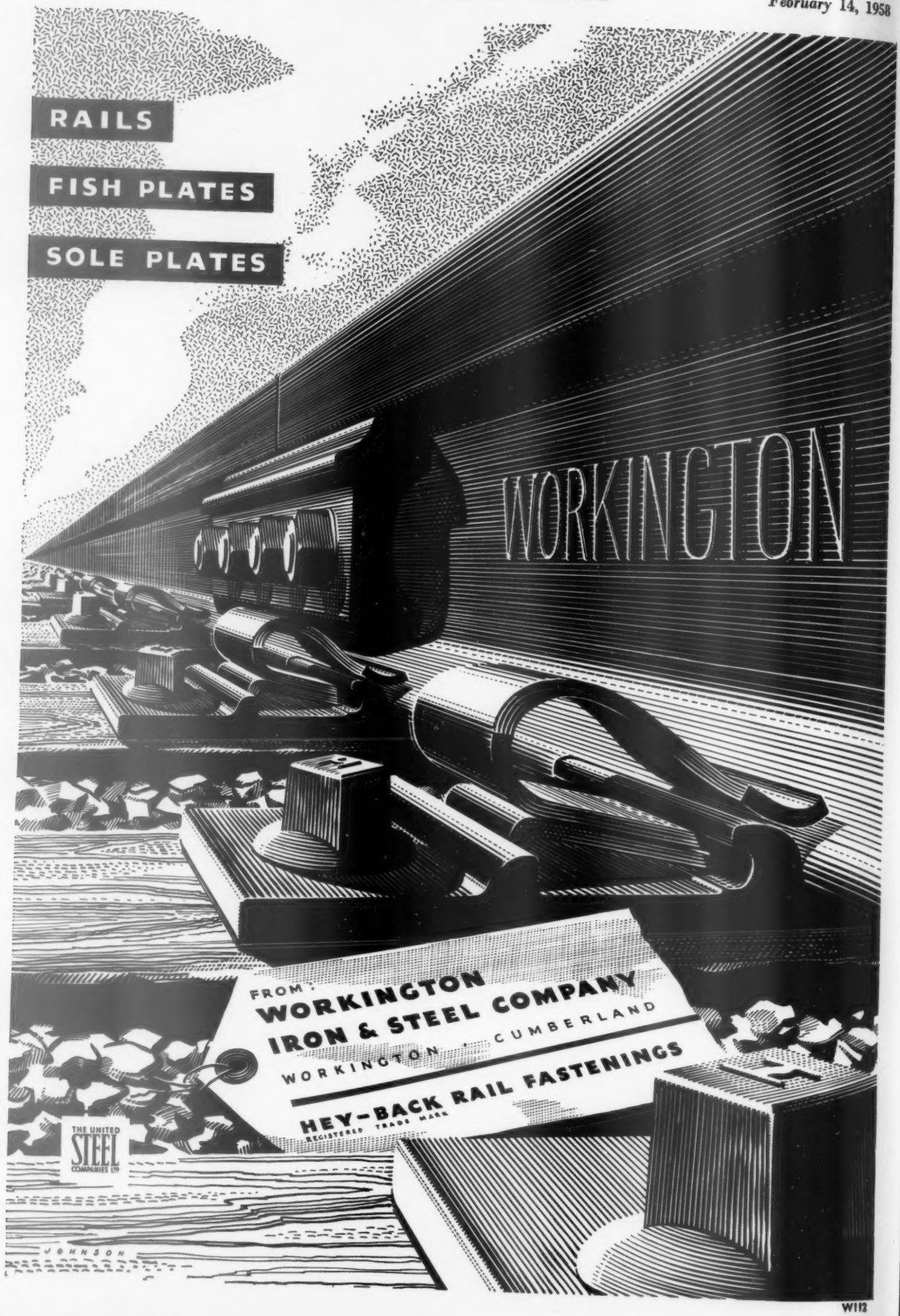
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### Playing with Fire

THE grave danger to the national economy that exists in the threat by the Labour Party to re-nationalise the iron and steel industry is recalled by the speech made last Sunday by Mr. Alfred Robens, Minister of Labour & National Service in the last Labour Government. The first function of a Labour Government in the field of public ownership, he affirmed at a party conference in Glasgow, would be to re-nationalise the iron and steel industry. As a reply to some chairmen of steel companies who had asked for a definite statement of policy, he added that this was a pledge. No industry is less suitable for nationalisation—or, in this case, re-nationalisation—than steel. It is well organised and highly efficient; its efficiency is recognised, according to Mr. Robens, by the Labour Party, which believes that public ownership is essential to economic planning on a national scale. If, however, the industry is efficient and organised, as at present, with a high degree of co-ordination, there is surely the less need for public ownership as a preliminary to planning. As has been pointed out by Stewarts and Lloyds Limited, the Government already has power, through the Iron & Steel Board, to ensure that the industry keeps in step with the nation's economic requirements. Why then interfere with a system which has allowed free enterprise to continue to push ahead with such remarkable success? The Chairman of the Lancashire Steel Corporation, Sir John James, has emphasised that the industry is entirely different than those already—and, as many people believe, unfortunately—nationalised. Each of these was a monopoly, depending on competitive industry to keep it alive, and without fear of foreign competition. The iron and steel industry is not only a basic industry supplying the home market, but exports against keen foreign competition. It has suffered the disturbances occasioned by nationalisation and subsequent de-nationalisation. It must be spared the consequences of a further change. Its efficiency is vital to that of the railways and of the railway equipment industries, which are of such importance in the export trade of Britain. The steel industry should be left alone to function, as it is functioning, with success.

### Remuneration of Area Board Members

THE number of members of Area Boards of the British Transport Commission is small, and, from total figures available, their individual remuneration is £500 a year—which is nominal, in view of members' other interests. The reason for the Opposition pressing Mr. Harold Watkinson, Minister of Transport & Civil Aviation, in the House of Commons last week to state the amount of these emoluments seems to have been a wish to make political capital out of the incorrect information that these fees had been doubled—at a time when the Government was encouraging the Commission to resist railwaymen's wage demands. The salaries of the Commission and of the vast majority of its employees are published. The Minister was technically right in refusing to divulge the salaries of individual Area Board members on the ground that this was a matter for which the Commission had been made responsible by Parliament. This he seems to have done so as to defend the right of a nationalised industry to deal with matters of detail delegated to it. It is important, however, that nothing should be said by a Minister which might suggest that he has something to hide when, as in this case, there is nothing and the facts can be readily ascertained.

### South African Railways Progress

MR. B. J. SCHOEMAN, Minister of Transport, speaking in the South African Assembly, referred last week to the great progress made by the railways in the last few years. Today, he stated, the South African Railways compared favourably with the best in other countries—and we agree that they are technically most efficient, and an example of what can be achieved with the 3-ft. 6-in. gauge. In the last 10 years £273,000,000 has been invested in the system, as much as was spent in the previous 50-60 years. Recent tenders issued, and orders placed, for locomotives and rolling stock, show that this rate of investment is to be maintained, if not increased. One such tender, for more than 1,000 passenger coaches, issued last November, represents the largest single tender for passenger stock ever called for by S.A.R. Mr Schoeman pointed out income had doubled, from £83,000,000 to £177,000,000 a year, and tonnage moved had increased from 52,000,000 to 75,000,000. The past year, the Minister said, had been the most difficult in the railways' history: foot-and-mouth disease, influenza, flood, washaways, and drought were among the problems encountered—but a working surplus is now apparent. An important new factor is the consideration now being give to diesel traction, both locomotives and railcars.

### Diesel Traction in Siam

THE enquiry for new diesel railcars being framed by the State Railways of Siam recalls that it is just 35 years since the railway first asked bids for diesel locomotives, and was rewarded by a quotation for 1,000-b.h.p. locomotives at £60,000 apiece, a sum equivalent today to about £160,000. The first diesels were placed in service in 1928. These were two 180 b.h.p. shunters by the Swiss Locomotive Works. These units were still at work two

years ago, and may be still. The years 1931-32 were the vital ones, for in that space were introduced six 1,000-b.h.p. Frichs locomotives, which used to run through from Bangkok to the Malayan frontier in 22 hr. with locomotive crews working on the caboose system; six Sulzer locomotives of 450 b.h.p.; one Frichs locomotive of 1,600 b.h.p.; and six Frichs railcars of 200 b.h.p. All this development was due largely to the Dane, Mr. H. A. K. Zachar, then chief mechanical engineer, and operation was looked after by the Englishman, Ingham Sutcliffe. It was these two men who laid the foundations of diesel traction in Siam well and truly; but the aptness of their pupils ensured that operation and maintenance has been kept to a high standard since, and has been extended to the Sulzer 735- and 960-b.h.p. locomotives of 1946-50, the subsequent American locomotives, and the recent Japanese units.

## Efficiency versus Cost in Transport

THE problems of transport operators in making a profit, or even in merely making both ends meet, whilst providing a passenger service satisfactory to users and public authorities, and in accordance with statutory obligations, have been ably outlined by Sir John Elliot, Chairman of London Transport and Past President of the Institute of Transport. His views are expressed in the paper he was due to give yesterday (Thursday) to the Northern Section of the Institute in Newcastle-upon-Tyne. Of particular interest are the instances he gives of the difficulties faced by London Transport, notably in catering for new housing estates—in the matter, for instance, of consistency, in deciding whether or not a new bus service is justifiable. He is certainly right in his firm belief in the efficacy of the yardstick of income as against expenditure, to measure efficiency, and to keep management and staff on their toes. He explains, however, that various factors, such as heavy capital expenditure, may make it impossible for a transport undertaking such as the British Transport Commission with its many statutory obligations, to do more than pay its way, "taking one year with another"—in the broadest sense. He shows in this paper that there is no simple answer to the question asked in the title: "Efficiency versus cost in public transport: what is the right answer?" The best aim in his view is the large one of "public service."

## Overseas Railway Traffics

RAILWAY receipts of South African Railways & Harbours in the week ended November 16, 1957, were £2,926,785 compared with £2,852,033 in the corresponding week of 1956. Receipts in general continued to rise above the previous year's figures in the following weeks, and at January 11, 1958, aggregate receipts from April 1, 1957, were £113,926,453 compared with £108,617,677 in the corresponding period of 1956-57. Harbours and Airways receipts also showed a considerable improvement on the previous year's figures with Airways aggregate receipts from April 1, 1957, some £1,250,000 up on the corresponding figures for 1956-57. East African Railways & Harbours approximate total railway revenue for the month of December 1957, was £1,622,000 compared with £1,540,000 in December, 1956; an increase of £82,000. The revenue earned in December was the highest achieved during the year due, no doubt, to the increases in rates and fares introduced in October, and heavy seasonal traffic.

## Personal Effort Needed

THE importance of personal effort by all railwaymen in checking the fall in British Railways freight receipts and indeed in increasing them is stressed by the "Man on the Line" in the February issue of *British Railways Magazine*. He refers to the new equipment and plant that will be coming into use in 1958. Then he rightly adds that modernisation of plant "certainly . . . won't, unless we seize the opportunity it provides, get us a ha'penny worth of extra traffic. It is men who get traffic; it is men who give service." There has been a tendency to regard as a panacea the new and improved plant being and to be provided under the modernisation plan. As the Chairman of the British Transport Commission, Sir Brian Robertson, has pointed out, there must also be "modernisation of the mind"—new ways of thinking, of looking at the jobs to be done, and often of doing them as well. The quality, including the reliability, of the service given by the railways is of vital importance to their prosperity; and it depends on the effort made by railwaymen.

## Public Relations in Transport

PUBLIC relations and publicity in transport is a large subject for one paper. Nevertheless that read by Mr. D. S. M. Barrie, Chief Public Relations Officer of the British Transport Commission, to the Yorkshire Section of the Institute of Transport in Leeds last Tuesday, covers the ground and contains some pertinent observations. Most railway undertakings are so big that their public relations are complicated by factors inherent in their size: difficulty in projecting policy along a long line of communication; increased likelihood of public criticism; and a substantial reaction to measures such as fare increases, which affect many people. This matter is discussed lucidly in the paper, as is that of engaging in public controversy. Among the points made is the importance of skilful letters to clients. Mr. Barrie rightly believes that much could be achieved by the systematic training of junior staff—who should, we feel, have some first-hand knowledge of the railway activity about which they are writing; the P.R.O's department must do more than reword notes from other departments in drafting an answer to a correspondent—or a Press announcement.

## Widening at Potters Bar

THE elimination of the two-track 2½-mile bottleneck between Greenwood and Potters Bar on the East Coast main line, Eastern Region, described elsewhere in this issue, was proposed in the latter part of last century by the then Great Northern Railway; but it was not carried out because of the construction of the Hertford loop line from Enfield to Stevenage, which provides an alternative, though slightly longer, route to the North from Kings Cross. The work now in progress involves the construction of three tunnels through clay, and is the first major railway tunnel work of its kind, in this country, since the mile-long Ponsbourne tunnel was constructed on the Hertford loop some 40 years ago. Vastly changed economic conditions have resulted in the evolution of new tunnelling techniques. The design of the tunnels now being built, put forward by the consulting engineers, Sir William Halcrow & Partners, is believed to be the first of its kind executed anywhere. When the whole of the widening scheme is completed by the end of 1959, there will be four or more tracks over the 22 miles of main line from Kings Cross to Welwyn Viaduct.

## Reorganisation of B.T.C. Police

THE principal changes in the organisation of the British Transport Commission Police Force resulting from implementation of recommendations by Sir Alexander Maxwell are the formation of a permanent Police Committee, abolition of the post of Chief Police Officer as it now exists, and appointment of a Chief Constable with full responsibility to the Police Committee for the efficiency of the force. Some details are given elsewhere in this issue. According to the official announcement by the Commission the object of the reorganisation is to provide "a clear chain of command." It is hard, however, to see why the chain of command is not clear under the present organisation, in which the Chief Police Officer, Colonel N. McK. Jesper, reports to the Commission through its Secretary General. Nor is the difference apparent between a Chief Police Officer and a Chief Constable. The creation of a Police Committee—whose names are listed in personal pages—seems another instance of that multiplication of such bodies to which the nationalised transport

undertaking seems so prone, and a further trespass on the time of busy men, though there is case for representation of the Commission's carrying undertakings on any body dealing with the police force.

### "Holiday Haunts" Again

THE best produced of the holiday guides published yearly before the last war by the four British main-line railway companies, and the one, we believe, with the widest sale, was "Holiday Haunts," published by the Great Western Railway. It is fitting, therefore, and a welcome sign of an intention to continue G.W.R. standards, that the five guides published by British Railways for the coming holiday season should bear this alliterative title, so pleasantly evocative and easily remembered. Four of the volumes deal, as in previous years, with areas of England and Wales, and a fifth with Scotland. For 1s. 6d. a volume there is excellent value between the gay coloured covers: besides the comprehensive lists of hotels and lodgings there are succinct topographical notes; a great many good, and some outstanding, photographic illustrations; maps; and much railway information.

### First Railbuses for British Railways

THE first of a number of prototype railbuses for British Railways was due to be exhibited at Marylebone Station yesterday (Thursday). This four-wheel unit, which has been designed and built by A.C. Cars Limited of Thames Ditton, Surrey, is one of 22 railbuses ordered from five manufacturers. Vehicles of this general design are intended for operation on certain rural services, to give a more economical performance than would be possible by using the standard bogie railcars. We have long advocated one-man operated railbuses on branch lines. They have been introduced on a wide scale in Germany and other countries, where they have been successful in regaining and creating traffic. In view of the light weight, much attention has presumably been paid to suspension, and the use of rubber would be of advantage. It is understood that power transmission components are similar to those for standard B.R. railcars, the engine being of 150 h.p.

### Irregular Block Working on C.I.E.

FATAL accidents on Irish railways have been very rare. The two worst were in Northern Ireland, on the Great Northern Railway at Armagh in 1889, and at Ballymacarrett Junction, Belfast, on the Belfast & County Down, in 1945. Another took place, however, on December 23, 1957, between Foxrock and Dundrum, on the former Dublin & South Eastern line, now part of Coras Iompair Eireann, from Shanganagh Junction, north of Bray, and Dublin Harcourt Street, when a diesel train, the driver of which was killed, overtook another which had had to slow down for a cow on the line. The case was inquired into by Mr. T. L. Hogan, Inspecting Officer to the Department of Industry & Commerce of the Republic. Some breakdown of block working occurred, resulting in the second train being admitted to an occupied section. The actions of a man at a level crossing occasioned some conflict of evidence.

## The Growing Problem of Freight Traffic

THE continued fall in freight traffic receipts on British Railways has now reached a stage when its seriousness cannot be disguised. Figures published by the British Transport Commission for the 52-week period to December 29, 1957, show an aggregate loss in revenue-earning merchandise traffic, as opposed to minerals, coal and coke, and livestock traffic of 803,000 tons over the corresponding period of 1956. Many of the more far-sighted railway officers, in recent months, have shown their awareness of the dangers which are inherent in this trend.

Their anxiety over two pertinent factors has been expressed by recent stimulating papers read before the Institute of Transport. The first, commented on in our October 18, 1957, issue, was the Presidential Address by Sir Reginald Wilson; the second, discussed editorially in our January 17, 1958, issue, was by Mr. C. P. Hopkins. Sir Reginald Wilson spoke of the important part which had to be played by the transport man of all ranks, while Mr. Hopkins stressed the need for a reliable service to customers of British Railways without waiting for the full benefits of the Modernisation Plan. The need for measures to secure additional traffic is recognised by the British Transport Commission in the recent merger of the functions of the Chief Commercial and Chief Operating & Motive Power officers into the single appointment of Chief Traffic Officer. This move was designed to enable full advantage to be taken of the new freight charges scheme, introduced in July 1, 1957, under which freight rates for the first time can be directly related to consignment weight and loadability. They can compete more readily with those of the road haulier who has never been subject to restrictive charging legislation.

The new charges, which have been hard fought for since the "Square Deal" campaign of the late thirties, while being a step in the right direction, so far have had little or no beneficial effect in increasing traffic. They still do not permit sufficient flexibility between regions operating over similar territories. One of the major disadvantages, which still has to be overcome, is that the economic gains of steel-tyre vehicles running on steel rails and offering quick transit between railheads, are lost in delays at terminals.

These many difficulties are time-honoured, and have been discussed by many individuals and in innumerable committees. Leaving aside handling of mineral and other lower classification bulk traffic, the container services for "smalls" are now an established feature of British Railways. Nevertheless, the tare weight of the container is not revenue-earning, and the costs of labour and mechanical handling, such as cranage at transhipment points, are high and increasing. Moreover, the need for facilities for the transhipment of containers reduces their full use.

The primary need is to educate railway staff of all ranks in the urgency of clearing traffic as quickly as possible; the recent increase in wagon demurrage charges seems to have done little more than annoy traders. Much discussion has taken place on the merits of various road-rail vehicles. In the United States of America several designs have been introduced, some of which have been seen by technical officers of the British Transport Commission. The possibility of adapting one or other of these designs to suit the loading gauge and traffic requirements of British Railways is a matter which should be pursued. If it is possible to devise a similar vehicle, suited to the needs of this country, its introduction should not be held up by lengthy discussion. The traffic situation is too serious for action to be delayed by talk.

In wartime, British industry has shown that it is well able to overcome at short notice the difficulties of special design. It must now be given both the opportunity and incentive to experiment. British Railways are faced with a challenge which, possibly with co-operation of the motor and allied industries, they should be able to meet. The designer must bear in mind the relative use of the vehicle as between road and rail. Its primary purpose should be to bring goods by road to rail-head, from there by rail to distribution point, and thence again by road to destination. A vehicle must be devised capable of spending approximately 75 per cent of its time on rail and 25 per cent on road. It must be a compromise vehicle, for no vehicle built for special use on rail can be effective on the road, and, conversely, no road vehicle is sufficiently strong to withstand railway operation. The ingenuity of the designer must be focussed on this problem. The essential need of British Railways at the present time is twofold. The traffic officer must bring a fresh and adventurous mind to the problem and must have full powers to implement a bold policy of competitive service. The technical staff must recognise the need for experiment with unorthodox vehicles to meet a special need of the present time.

## "Frozen" Rail Joints

ALTHOUGH some railways overseas can claim longer mileages of long-welded rail than can British Railways, much important experimental work on the subject of rails in continuous lengths has been done in this country. This work is referred to by Mr. G. D. S. Alley, Assistant Engineer (Permanent Way), British Railways, Western Region, in his paper read to the recent annual general meeting of the Permanent Way Institution. At the same time, he underlines certain of the difficulties which have been experienced, a few of which have yet to be overcome.

Over 20 years have passed since welded rails were satisfactorily introduced on the Victorian Railways by the late Sir Harold Clapp; it was he who convinced the late Lord Ashfield of their potential savings on the lines of the then London Passenger Transport Board. Many railways now have long lengths of welded rails. The Atchison, Topeka & Santa Fe Railroad has standardised their use on its main lines, although the range of temperatures in the territories it serves is exceptionally wide. The railway that can claim pioneering achievement in regard to long continuous-welded rails is the Delaware & Hudson, on its main line stretching from Albany, New York State, to Montreal. It is with special interest, therefore, that we have read of the trials this railway is making with "frozen" joints, where the rails are laid tight, allowing for no expansion at the joints.

Thus elimination of joint maintenance is a main argument in favour of welding into long lengths. The weld itself is expensive, not to speak of the extra cost of handling the long lengths of "ribbon rail." Furthermore, if a rail is damaged, it can easily be replaced, whereas with ribbon rail the section damaged has to be cut out.

The question has been the subject of investigation by the Economics of Railway Labour Committee of the American Railway Engineering Association. The conclusions reached by that body suggest that there may be extensive potential maintenance economies to be effected by laying rail tight with frozen joints.

## Steel Locomotive Fireboxes

THE use of steel for the welded fireboxes of the "Merchant Navy" and "West Country" class locomotives of the Southern Railway, introduced in 1941, at first caused some apprehension in certain quarters. This was to some extent because of the lack of previous experience in the United Kingdom in this application. Mr. M. G. Burrows, now Chief Mechanical & Electrical Engineer (Designate), North Eastern Region, and formerly Mechanical Engineer, Southern Region, Brighton, and Mr. A. L. Wallace, Technical Assistant, Chief Mechanical & Electrical Engineer's Department, Southern Region, Brighton, in their joint paper, "Experience with the Steel Fireboxes of the Southern Region Pacific Locomotives," given to the Institution of Locomotive Engineers last Wednesday, state that subsequent experience with these engines on the Southern Railway and in the Southern Region confirmed the confidence in steel as a material for fireboxes shown by their designer, Mr. O. V. S. Bulleid, when Chief Mechanical Engineer of the Southern Railway.

The paper was prepared to give a survey of the experience gained with boilers fitted to these Southern locomotive classes, and the methods of repair which have been adopted. Because the steam locomotive will continue to form a considerable proportion of the motive power of this country at least, it seems that any development which will lead to the improvement of the efficiency of this form of traction can still be valuable.

The value of properly controlled boiler feed water treatment is emphasised, particularly for the satisfactory performance of steel fireboxes, and in this, agrees with the experience of the French National Railways with fireboxes of this type. A noticeable factor in the performance which the locomotives have given in the Southern Region has been the ability of boilers to meet demands for steam.

The development of efficient methods of specialised fabrication techniques necessary for the production of satisfactory welds was arrived at, generally, by trial and error. At Eastleigh works, where the first "Merchant Navy" fireboxes were made, a "make-and-break" method of depositing the root run was evolved. This method has the advantage that a wide root gap can be bridged and that the weld is equally satisfactory should there be any variation in the gap. After the slag has been removed, by light chipping with a broad round-nose chisel, the second run is carried out in a similar manner, but using straight runs instead of "make and break." For the third run the progressive downhand method is employed. After the weld has been completed from the V side, it is chipped out from the back and a sealing run applied. This basic method is applied to all the seams of the firebox except in the case of the final weld between inner and outer fireboxes where it is not possible to seal weld. Radiographic examinations made during production confirmed that consistently sound welds were obtained with good penetration and very little porosity.

The authors deal at some length with the detailed techniques of fabrication which have been evolved for the various firebox components. It was natural that particular care should have been taken to produce satisfactory firebox welds on the first boiler, and complete inspection by X-ray of the welds was effected; very thorough examination by means of this equipment has been maintained for every boiler which has been constructed.

A paper by Mr. Bulleid, given to the Institution of Mechanical Engineers in December, 1945, described some of the earlier troubles experienced with the boilers, and these are included as well as a description of some later operating experiences. A major cause of many of the failures is believed to be associated with the unsatisfactory cooling arrangements then in force, and to poor feed water.

At first the same procedure for cooling down the boiler prior to washing out and/or repairs was followed as with other types of fireboxes; this allowed cold water to reach the lowest part of the firebox too quickly, setting up internal strains. In consequence, a procedure was drawn up to cover the means of introducing the cooling water, and regulating the rate of cooling, in order to ensure that no ill effects would be felt. Experiments with hot water washing out facilities have shown that with adequately controlled cooling down, there is no advantage with hot washing boilers which are under full water treatment. The vital importance of effective washing out is stressed; at some depots of the Region booster pumps were installed to increase the water jet pressure to assist in dislodging and washing away all the scale.

The need for a more fully controlled system of water treatment than pertained at the time, in areas where the water was of a chalky nature, first became apparent in 1945, and in 1946 bulging was discovered in the side wrapper plate of one of these boilers because of fairly extensive corrosion. It was found that the plate had in some places wasted away from its original thickness of $\frac{3}{8}$ in. to approximately $\frac{1}{4}$ in. The boiler concerned had then run a mileage of 169,000. As a result, steps were taken to give the T.I.A. (Traitement Intégral Armand) system, developed by Monsieur Louis Armand, recently President of the French National Railways, a trial on the Southern Railway. This system was described in our issue of April 5, 1957.

The results obtained in eliminating scale and reducing the corrosive action of the boiler water were so promising that it was decided to fit both classes of locomotive with this equipment. The authors state that the introduction of comprehensive water treatment proved to be the turning point in the history of steel fireboxes on the Southern Region.

More attention has recently been paid to the tube feeder method of internal water treatment. As this method has now been shown to be as effective and much cheaper to provide and maintain than T.I.A., the future tendency will be for the latter method to be supplanted. The standard

of control will not, however, be relaxed in any way. The effectiveness of the treatment is shown by the fact that the average life of original fireboxes (not including the first one renewed) was a little over seven years. In comparison, none of the other locomotives of the two classes fitted with water treatment equipment have required new fireboxes since they were built; the life of many of these fireboxes is now already over 12 years.

Standard methods of workshop repairs evolved for boilers of this type are also described by Mr. Burrows and Mr. Wallace, besides an anlysis of the service records of the boilers. Figures quoted show that with full water treatment, mileages of 250,000 between lifts are obtainable. It is considered that the saving in repair costs achieved, together with the increased period between washouts, more than compensates for the cost of operating a fully controlled internal water system. The experience of the Southern Region seems to compare very well with normal results obtained with T.I.A. on the French National Railways.

## British Transport Commission Traffic Receipts

PETROL restrictions caused by the closing of the Suez Canal during the winter of 1956-57 invalidate any comparison between the first four-week periods of 1957 and the current year in respect of the passenger and freight traffic of the British Transport Commission railway and road undertakings. Comparison with the first four weeks of 1956 is not encouraging as regards British Railways freight. Railway merchandise and livestock traffic receipts for the period were £7,332,000, against £8,009,000 two years ago, and mineral receipts £3,920,000 (£4,108,000), though coal class traffics at £10,606,000 (£9,945,000) show some improvement, as do parcels at £3,717,000 (£3,231,000). The total freight receipts from inland waterways freight, road haulage, and ships for Period 1 of this year were less, at £3,946,000, than two years ago (£4,153,000), for which the sale of British Road Services vehicles appears to be partly responsible.

| — | Four weeks to January 26 | | Incr. or decr. |
|---|---|---|---|
| | 1958 | 1957 | |
| | £000 | £000 | £000 |
| *Passengers—* | | | |
| British Railways | 8,199 | 8,956 | − 757 |
| London Transport: | | | |
| Railways | 1,806 | 1,921 | − 115 |
| Road services | 4,326 | 4,632 | − 306 |
| Provincial & Scottish buses | 4,009 | 4,310 | − 301 |
| Ships | 252 | 227 | + 25 |
| Total passengers | 18,592 | 20,046 | − 1,454 |
| *Freight, Parcels & Mails—* | | | |
| British Railways: | | | |
| Merchandise & livestock | 7,332 | 9,439 | − 2,107 |
| Minerals | 3,920 | 4,418 | − 498 |
| Coal & coke | 10,606 | 10,761 | − 155 |
| Parcels, etc., by passenger train | 3,717 | 3,648 | + 69 |
| Collection & delivery, etc. | 934 | 1,050 | − 116 |
| Total freight British Railways | 26,509 | 29,316 | − 2,807 |
| Others* | 3,946 | 3,944 | + 2 |
| Total Freight, Parcels & Mails | 30,455 | 33,260 | − 2,805 |
| Total | 49,047 | 53,306 | − 4,259 |

* Inland waterways freight, road haulage, and ships

Fare increases during the past two years would be expected to result in higher passenger receipts. For the first four weeks of 1958, British Railways passenger receipts were £8,199,000, against £7,315,000 in 1956, which seems satisfactory. London Transport railway receipts were £1,806,000 (£1,689,000) and road services receipts £4,326,000 (£4,059,000), though there is no true comparison in the case of L.T.E., because of adjustments of bus services. The increase compared with two years ago in provincial and Scottish bus receipts (£4,009,000 against £3,612,000) does not appear to reflect, at least to any great extent, the dropping-off in public patronage of buses reported generally in the road passenger industry; though, to make any assessment, it would be necessary to take into account all rises in fares.

PERCENTAGE VARIATION 1958 COMPARED WITH 1957

| | Four weeks to January 26 |
|---|---|
| *British Railways—* | |
| Passengers | − 8·4 |
| Parcels | + 1·8 |
| Merchandise & livestock | −22·2 |
| Minerals | −11·2 |
| Coal & coke | − 1·4 |
| C. & D. services | −11·0 |
| Total | − 9·3 |
| Ships (passengers) | +11·0 |
| *British Road Services, Inland Waterways and Ships (cargo)* | — |
| *Road Passenger Transport, Provincial & Scottish* | − 6·9 |
| *London Transport—* | |
| Railways | − 5·9 |
| Road services | − 6·6 |
| Total | − 6·4 |
| *Aggregate* | − 7·9 |

## Freight Working in the U.S.A.

DESPITE the reductions in operating costs achieved by U.S.A. railroads through mechanisation of marshalling yards, road competition for freight traffic remains a grave problem. Some ways in which it is being faced are described in the current issue of *British Transport Review* by Mr. H. R. Gomersall, Planning Officer (Reconstruction), British Railways, Eastern Region, who spent some weeks in the U.S.A. last year with other British railway officers studying railway and road equipment and operation.

The most widely known measure taken in North America to combine the inherent ability of railways to move bulk loads quickly over long distances, with the convenience of door-to-door transport without double handling afforded by the road vehicle, is "piggy-back" transport. This has grown to a very great extent. The quality of the service given, rather than the rates, are the cause of its popularity. Many special trains are run between terminals specially adapted; and the system has retained, and created, traffic. It has the advantage of simplicity and conformity with a standard operational pattern. It is made possible by the ample loading gauge, which enables the articulated lorry—the conventional road freight vehicle in that country—to be carried on flat wagons. The restricted British loading gauge makes it impossible in this country, and even on the Continent. Most U.S.A. railways operate their own service and provide the wagons and ancillary equipment. A few, such as the Pennsylvania and the New Haven, accept loads from all road hauliers. The rates charged are usually those of the published road haulage rate for the throughout journey, or, in the case of haulage for common carriers, an agreed proportion of the throughout road haulage rate. The disadvantage of piggy-back transport, which Mr. Gomersall points out, is the relatively large amount of equipment which must be hauled compared with the payload.

The orthodox container, as known in Britain, is rare in the U.S.A., principally, he believes, because of the specialised loading and unloading devices it needs, present restrictions on the size and weight of containers, and an "apparent reluctance to tackle the rates problem." The New York Central is stated to be experimenting with the Flexivan, virtually a conventional articulated road trailer from which the wheels have been removed and which can be conveyed on a well wagon.

An important development, and the first true road/rail vehicle for freight operation so far developed, is the Railvan, devised by the Chesapeake & Ohio Railway, which has experimented with it. It was described and illustrated in our issue of April 26, 1957. Briefly, it consists of an orthodox road trailer body fitted with a

strengthened spine capable of absorbing considerable buffing loads. At one end of the body are two pairs of wheels, one for rail and one for road, which can be raised and lowered as necessary. The C. & O. management is satisfied that provided the vehicle could be used in reasonable numbers, it should afford greater economy of operation than do railway wagons and road vehicles of conventional types. Tests proved two prototypes to be generally satisfactory though as a result of trials it was deemed necessary to design a new underframe which should afford inter alia further reductions in weight and cost. A third prototype Railvan is under construction.

The chief lesson to be learned from U.S.A. freight working is that improved equipment and new devices are not in themselves enough to arrest the fall in freight traffic, and to create new. This is largely a matter of personal effort and alertness of mind. That is not to say that what was observed by Mr. Gomersall and his colleagues in the U.S.A. should not be studied, notably in relation to reducing the amount of shunting and lowering its cost by use of suitable devices in marshalling yards, and to minimising damage caused by impacts.

# LETTERS TO THE EDITOR

*(The Editor is not responsible for opinions of correspondents)*

## Suburban Electric Stock

January 22

SIR,—The letter from Mr. J. E. Lake in your January 17 issue claims in effect that Southern Region suburban electric stock can carry an average of some 140 passengers per vehicle and implies that no stock with guard-controlled sliding doors can equal this. May I suggest, therefore, that in other Regions and on London Transport there are cars of the latter type in which as many and more persons can be assembled?

Discomfort is inevitable in such crowding on either type, but the more crowding there is the greater is the need to abolish the swinging door peril.

Yours faithfully,

JUMBO

## Southern Region Suburban Services

January 30

SIR,—It has been stated that no more trains can be run in peak hours over the most congested parts of the Southern Region routes to and from Cannon Street and Charing Cross. This part is between Metropolitan Junction and the site of the old Spa Road Station. The palliative provided by the introduction of 10-car trains, which could only stave off the time when maximum capacity would be reached again, has already done its work. Unless there is an increase in track capacity, building development in the South-East area must cease.

Operation of the Mid Kent and Bexleyheath lines should be transferred to London Transport and their services become a part of the District and Metropolitan lines, by being diverted over the East London line at New Cross. At present a total of 17 trains an hour is run from the Mid Kent and Bexleyheath lines to Charing Cross and Cannon Street, plus two to Blackfriars or Holborn. Trains on the East London line can readily be lengthened and their frequency increased.

The East London line should be connected by non-conflicting junctions at St. Marys Junction (Whitechapel), Minories Junction, and Aldgate Junction to enable East London trains to run on to the District and Metropolitan lines without disturbing the train services over these lines. The train services to the Mid Kent and Bexleyheath lines should be provided by diverting to the East London line the District and Metropolitan Circle trains, instead of running them via Aldgate to continue their circle. This would provide 16 trains an hour of eight cars each. Additional trains required over the East London line would be available from the District line by extending services now terminating at Mansion House, and from the Metropolitan line by extension of some trains which now terminate at Moorgate or Aldgate.

Two more tracks would probably be required between New Cross and St. Johns for the East London line trains and these would be connected directly to the Lewisham line at St. Johns. This would add to the cost, but the wholesale clearance of 17 trains hourly from the congested London Bridge area would make possible more trains from the Kent Coast and elsewhere, which would bring in additional revenue.

The only alternative to this proposal, apart from those which appeared in the London Plan soon after the war, is a complete rebuilding of the line between Spa Road and Metropolitan Junction, and Cannon Street to provide six tracks throughout, a non-conflicting junction at Borough Market, and probable increase in the number of platforms at Cannon Street and Charing Cross. This is hardly feasible.

Yours faithfully,

E. C. B. THORNTON

38, Green Curve, Banstead, Surrey

## British Railways Prototype Open Saloon Coach

February 1

SIR,—The British Railways prototype second class saloon coach described in your January 31 issue has only 39 seats, compared with 42 in existing first class and 64 in existing second class vehicles of the same size.

Has this prodigal use of space and tare weight any economic justification? As it is, many trains are already overcrowded at holiday times. Surely the inevitable result would be to raise the cost of second class travel to such an extent that a third class would have to be introduced, with 64 seats in a vehicle.

Yours faithfully,

R. P. SMITH

25, Highfield Road, Marple Bridge, Stockport

## Design Appearance in Railway Equipment

February 1

SIR,—The editorial notes in your issue of January 24 include a very sound résumé of Mr. G. Williams' recent paper to the Design & Industries Association. You quote his definition of the basis of good design as "honesty and sincerity, coupled with technical ability and good workmanship." This is surely not a rash statement; but apparently you think it is going too far in the direction of urbanity, for you seek to unsay what has gone before by concluding: "Is it not possible, however, that what is æsthetically acceptable to one person (and therefore, one assumes, to a proportion of the public), may have an adverse effect on another? Tastes differ."

A good appearance resulting from good design is not a question of taste, but of clear thinking. Some people are experienced in organising shapes into groups that integrate and say clearly, for all to see, "this is a locomotive" or "this is a platform ticket"; but it is not implied that they are arbiters of taste. If the results of their efforts are to make the products nearer to recognisable ideals, then the products will be good to look at. This is an æsthetic objective which transcends personal taste. An alternative to the British Transport Commission Design Panel is to settle for a tasteless mediocrity.

Yours faithfully,

J. BERESFORD-EVANS

Neatham Grange, Alton, Hants.

# THE SCRAP HEAP

### Crow Whistle

On the Norwich to Yarmouth railway people have been puzzled by regularly hearing a diesel train's distinctive high-pitched "toot-toot" — and seeing no train. The mystery was solved by Mr. Edward Ellis, a Norwich naturalist. "Crows have been imitating the trains. All birds of the crow family are noted mimics," he said.—*From the "Daily Herald."*

### Gracious Travel on a Branch Line

My wife and I boarded one of those small branch-line trains that still run in certain parts of England. As it was due to start—only one coach and a small engine—a lady, flushed and out of breath, ran up to the driver, who was leaning out of his cab window, to ask him whether she would have time to hurry along to the other end of the platform to get her luggage. "Certainly, ma'm," we heard him say. "We'll wait for you." And he did. So we left the station five minutes late, which time he made good later. . .

We have travelled several times on this little train. Its unruffled atmosphere appeals to us and we have no difficulty in picturing what it must have been like to travel in early days. The countryside is much the same, and most of the old landmarks are still there, though in some places roads have sprung up out of the fields and lanes, and two of the railway stations have been abandoned. . . Now and again the engines have a habit of failing, just as horses had a habit of bolting. These railwaymen, bless them, have not lost their efficiency, their friendly manner or their good will. . . A trip on this branch line is like a breath of fresh air. Last spring we saw the train, as it was passing, from the road and the driver recognized us. He smiled and greeted us with "cuck-oo, cuck-oo, cuck-oo," on his whistle.—*From "The Times."*

### Ample Choice

Menus in the restaurant cars of the Hungarian State Railways are to offer five different soups, 12 kinds of hors d'œvres, eight varieties of stew and 13 different grills.

### First Customer

The British Transport Commission recently placed a contract with Papworth Industries, Cambridge, for 200 4-ton standard B.D. type containers. As the containers were completed they were moved to an adjoining factory, where Papworth Industries manufacture suitcases and travel goods. Suitcases for despatch were loaded into the new containers, which were then consigned by rail to destination.

### Early C.N.R. Pacific Retired

The oldest passenger locomotive on the Canadian National Railways has been withdrawn from service. Pacific locomotive No. 5529 is one of a class built by Montreal Locomotive Works 52 years ago for the former Intercolonial Railway which became part of the C.N.R. They were used in their early days to haul the "Ocean Limited" between Montreal and Halifax. As more powerful engines became available, the class was relegated to secondary passenger services.

### Light of Reason ?

To the many excuses made in court by railway travellers prosecuted for "improper use" of the communication cord must now be added insufficient light in the coach. A passenger in a Southern Region suburban electric train from London Bridge to Epsom Downs last week could not see to read, as the lights in the coach were not fully switched on. He pulled the communication cord. In due course he was fined £5 by Croydon magistrates.

### Viceregal Saloons as Fishing Lodge

Two viceregal saloons of the New Zealand Government Railways in the North Island were used recently by the Governor General, Lord Cobham, and Lady Cobham, for two weeks as a fishing lodge when trout fishing in the Lake Taupo area. The saloons were placed in a secluded part of Waiouru Military Camp siding.

### Railways "Unjustly Maligned"

Before returning to England at the end of his three years' term as conductor of the National Orchestra, James Robertson . . . admired the thought and energy that had gone into the creation of great public works projects, including networks of railways, in New Zealand's awkward topography. "I think," he said, "the railways too are unjustly maligned. . . ." During his three years' conductorship of the National Orchestra, he probably did more travelling by rail throughout this country than the average New Zealander does in a lifetime.—*From the "New Zealand Railways Staff Bulletin."*

### Spring Song

I have heard the diesel singing
Its love song to the morn,
Terrifying tremors bringing
To the lamb that's newly born;
But a sweeter sound, and fairer
Than the diesel's mating cry
Is the rhythmic song, now rarer,
Of a steam train passing by.
Winter's woes come all too near us,
Winter's weeks are cold and long
And we need much more to cheer us
Than a diesel's dismal song.
Now we know that, while old winter
Dishes out the frost and rime,
That industrious chap, the printer,
Has been having quite a time.
While the Spring-ward crawl progresses
Back rooms work with might and main.
Railway guides pour from the presses
And the bookstalls bloom again.

A. B.

## Electric Working in Turkey

(*See our issues of September* 30, 1955, *and May* 25, 1956)

*Photo courtesy]* ["*La Vie du Rail*"

*"Simplon Orient Express" leaving Istanbul, hauled over electrified section (25 kV., 50 cycles) by French-built Bo-Bo locomotive*

# OVERSEAS RAILWAY AFFAIRS

*(From our correspondents)*

## INDIA

### New Name for Standards Office

The name of the Central Standards Office at New Delhi and Chittaranjan has now been changed to Research, Design & Standardisation Organisation.

Matters concerning civil engineering and signal work are dealt with, in the first instance, by the Director, Standardisation (Civil Engineering), Ministry of Railways, Research, Design & Standardisation Organisation, Baroda House Annexe, New Delhi. Those concerning carriage and wagon subjects including specification for merchanical items are handled by the Director, Standardisation (Mechanical Engineering), at the same address as above. Locomotive and crane matters are the concern of the Director, Standardisation (Mechanical Engineering), Ministry of Railways, Research, Design & Standardisation Organisation, Chittaranjan.

### Withdrawal of Restaurant Cars

It was announced recently that, to increase the passenger capacity of some main-line trains, air-conditioned coaches were being withdrawn from these services and replaced by third class coaches. With the same object, restaurant cars are being replaced by third class coaches in certain expresses. Light refreshment facilities are understood to continue in these trains.

### Erection of Ganges Bridge Girders

Mention was made in the article in our January 17 issue of the erection of the main double-deck girders of the Ganges Bridge at Mokameh. Those at the landward end of the southernmost span were erected on falsework. Since then, erection by cantilevering has begun. The accompanying illustration shows the work in hand on the riverward half of the same span. Two main spans out of 14 have been erected and the third is in hand. Erection work is making satisfactory progress.

### Tambaram-Villupuram Electrification

A start is now due to be made on electrification at 25 kV., 50 cycles, of the metre-gauge main line of the Southern (former South Indian) Railway from Tambaram, terminus of the existing Madras suburban electrification, and the important junction of Villupuram. It is not intended, apparently, to double the line, but to increase capacity by re-signalling, besides the increased throughput made possible by higher running speeds.

## SOUTH AFRICA

### Passenger Traffic

Final figures of passenger traffic on the South African Railways during the six-month period, April to September, 1957, show that the total number of passengers was 132,967,313, an increase of 665,833 over the corresponding period of the previous year.

First class passenger journeys declined from 30,070,113 to 29,263,821, and second class by nearly 300,000; but in the third class there was an increase from 76,078,872 during April-September, 1956, to 77,838,549 last year.

The Witwatersrand suburban services, the most extensive in the Union, showed an increase in suburban passengers of from 59,390,373 to 60,410,566, but the number of first class passengers declined from 8,588,367 to 8,003,307.

### Explosion in Elsburg Yard

A railway wagon containing 69 cylinders of liquid petroleum gas exploded at Elsburg in the Transvaal on January 20. The wagon caught fire in the Elsburg marshalling yard with 10 petrol wagons standing on either side. Two railwaymen, seeing the danger, coupled the burning wagon to an engine and moved slowly out of the yard to avoid fanning the flames. A few minutes after uncoupling the wagon, the explosion occurred.

### Escalators for Johannesburg Station

Most of the material for the 11 escalators with which the new passenger station at Johannesburg is being equipped had been delivered recently. The escalators are being supplied to the Railway Administration by Waygood Otis (S.A.) Limited.

## EAST AFRICA

### "Tribal" Class Locomotive Named

The "Basoga" locomotive, No. 3121, was officially named by Mr. H. W. Muloki, Kyabazinga of the Basoga tribe at Jinja on February 6.

This was the tenth "Tribal" class locomotive to be named at an official function by a senior representative of the tribes concerned. Altogether there are 103 locomotives in the "29," "30" and "31" classes, all of which will bear the names of the most prominent of the East African tribes. The "31" class engines were built by the Vulcan Foundry Limited.

## FRENCH SOMALILAND

### Franco-Ethiopian Railway

The granting of self-government to the territory of French Somaliland has resulted in difficulties in attracting traffic from and to Ethiopia over the Franco-Ethiopian Railway via the port of Jibuti. The railway, which runs from the port to Addis Ababa, is French-owned; negotiations with Ethiopia to associate that country as an equal partner in the railway are reported to have broken down over the price to be paid. Traffic from Ethiopia is stated to be moving increasingly by road to Eritrean ports.

## EGYPT

### Helwan Railway Bridge

The new railway bridge at Helwan, over the Nile south of Cairo, is to be opened on July 23. The structure is 2,690 ft. long. The bridge is being built by a Hungarian State engineering unit.

*Initial cantilever erection work on the main girders of the bridge over the Ganges at Mokameh*

## ARGENTINA

### New Diesel-Electric Locomotives

The first 16 of the 130 general service diesel-electric locomotives being built by Alco Products Inc. of Schenectady have been shipped and will be placed in service on the D.F. Sarmiento Railway, which has been assigned a total of 30; 55 will go to the General Mitre and the rest to the General San Martin Railway.

They are of the DL 540 type, weigh 103 tons, have 12-cylinder V engines, and develop 1,950 h.p. Their maximum speed is 75 m.p.h., at which they can haul a 400-ton train; at 36 m.p.h., they can haul 1,600 tons.

The General Roca Railway will shortly work the Constitución-La Plata Service with some of the new Alsthom diesel-electric locomotives recently delivered.

### Railway Police

It has been decided to create a special corps of railway police for protection of railway property.

## FRANCE

### S.N.C.F. Traffic in 1957

In 1957, the number of passenger-km. recorded on the French National Railways totalled 33,000 million, 7 per cent more than the 1956 figure and 49 per cent more than that for 1938. In freight traffic, *tonne*-km. in 1957 were about 54,000 million, a rise of 7·6 per cent over the total for 1956 and of 104 per cent compared with 1938. Both passenger-km. and *tonne*-km. were higher than in 1929 by 17 per cent and 29 per cent respectively.

### Apprentice Centre at Marseilles

Monsieur Jean Sauvajol, Director of the Mediterranean Region of the S.N.C.F., recently attended the inauguration of the reconstructed apprentice centre at Marseilles. The prewar centre was severely damaged during the war and transferred to premises at Logis-Neuf. The work of the centre has since been extended. The classrooms and dining hall have been modernised, and individual sleeping cubicles are now provided. Provision has also been made for recreation, including outdoor activities.

## AUSTRIA

### Electrification of the "Südbahn"

Many buildings have been reconstructed in connection with electrification from Vienna to Villach and the South.

The passenger stations and layouts at Brunn-Maria Enzersdorf, Neukirchen, and Gloggnitz are being altered. A new passenger building at Loebersdorf will be put in hand this year or next, as the financial situation allows. At Wiener-Neustadt the passenger station is being remodelled simultaneously with the yard. Laying of new tracks for trains of the Schneeberg Railway will enable the present Schneeberg station to be abandoned. During the work on the marshalling yard there have been considerable movements of the subsoil, necessitating costly remedial measures.

## ITALY

### Doubling on Simplon Line

Work has begun on doubling the single-line section of the Milan-Domodossola main line between Gallarate and Arona. The re-building of a tunnel is involved and the widening of a viaduct.

## HUNGARY

### New Rolling Stock

Seventy nine-compartment railway coaches will be built this year at the Dunakeszi Railway Workshops, Budapest. The six seat compartments will have adjustable head, arm, and foot rests. There will be four doors on each side to shorten stopping time at stations.

## Publications Received

*The Dundalk, Newry & Greenore Railway and the Holyhead-Greenore Steamship Service.* By D. S. M. Barrie. Lingfield, Surrey: The Oakwood Press, Tandridge Lane, 8¾ in. x 5½ in. 68 pp. Illustrated. Price 12s. 6d.—That unusual railway, the Dundalk, Newry & Greenore, has been happier in its epitaph than it was in its career, and we welcome the present volume, both in its inception and in its execution. Just before the dissolution of the company last year, the directors (nominees of the British Transport Commission) considered it desirable to have an officially-sponsored record prepared, and the idea has been carried out admirably. Although it owned only 26¼ route-miles of railway, the D.N.G.R. possessed, amongst other things, a port, an hotel, a golf course, bathing machines, a reservoir, water supply, sewage system, and electricity supply. For the greater part of its corporate life, the company was owned entirely by British transport interests, sucessively the L.N.W.R., the L.M.S.R., and the B.T.C. After the partition of Ireland in 1921, the railway was partly in the Free State (now the Republic) and partly in Northern Ireland, and the resultant legal complexities both hampered the undertaking in its later life and also retarded its abandonment and disposal of assets. Mr. Barrie's fascinatingly told and very well illustrated story ranges from the legal and financial, through train services and traffic, locomotive and rolling stock details, to damage during the "troubles" and even the the comic as exemplified by "the unusual affair of Mrs. McKivron's goats." Few readers will cavil at his conclusion that the undertaking "was a failure which nevertheless at one time contributed materially to the development of travel and traffic between Great Britain and Ireland, and which added a picturesque chapter to the story of railways in Ireland."

*Ein Jahrhundert Schweizer Bahnen* (A Century of Swiss Railways), Vol. III: Rolling Stock. Frauenfeld, Switzerland: Verlag Huber. 10 in. by 7 in. 545 pp. Illustrated. Price Swiss fr. 32 (fr. 124.30 for the five vols. forming the complete work). To mark the centenary of the first Swiss railway, the line from Zurich to Baden, opened to the public in 1847, the Federal Post & Railway Department decided to issue a large-scale history of Swiss railways during that century. Planned to comprise five volumes, it has only now been completed with the publication of Vol. III, devoted to rolling stock. The last volume to be published is, like its predecessors, well produced and is particularly rich in illustrations. It covers all aspects of rolling stock from 1847 to 1957.

*Sixteen Questions about the Selection and Training of Managers.*—A booklet of 36 pp. written by Colonel L. Urwick, of the firm of management consultants, Urwick, Orr & Partners Limited, deals with some of the problems of selecting and training future business managers. Such questions as the qualities of potential managers, the required training, and what facilities exist to assist this training are covered. The author lists his answers in note form so that the total of choices open to a business or company under each question can be quickly seen. The booklet may be obtained from the firm at Urwick House, 29, Hertford Street, London, W.1, price 2s. 6d., post free.

*Specifications for Aluminium and Aluminium Alloy Products.*—This reference book gives in tabular style a summary of all the official British specifications for aluminium alloys in semi-fabricated forms. It also includes the proprietary names of the alloys that are offered by British manufacturers to meet these specifications. The book is principally of value to buyers, designers and others concerned with the specifications for aluminium aloys. It is available on request to the Northern Aluminium Co. Ltd., Banbury, Oxon.

*Gastronomic Guide to Britain.*—Victor Britain Limited, the firm which has devised the Autobritn Plan for self-drive cars to meet travellers at railway stations, and the Gold Card facility, has published a new edition of its "Gastronomic Guide and Traveller's Friend," or "Dine and Drive Through Britain." This shows 399 places in a list representing the choice of an impartial committee. It is obtainable from Victor Britain Limited, 12a, Berkeley Street, London, W.1, price 6d.

# Progress of East Coast Main Line Widening

*Earthworks and tunnelling operations between Greenwood and Potters Bar*

*Completed section of tunnel, showing light railway track for spoil disposal*

TO extend the continuous four-track section of the East Coast main line out of Kings Cross, Eastern Region, British Railways, a double-track section, some 2½ miles long, between New Barnet and Potters Bar Stations, is being widened. The initial stages of this work were described in our issue of May 3, 1957.

The scheme involves duplication of three double-line tunnels, 384 yd., 232 yd., and 1,214 yd. long. The intermediate one of these, Hadley North tunnel, 232 yd., is complete, and work is in progress on the Potters Bar tunnel, 1,214 yd. Some three-quarters of this tunnel has been cut and lined in pre-cast concrete units with dry joints. Because steam locomotives will continue to run on this line for some years to come, the cement used in all units and in the shafts, except for the large invert segment, is Sealithor metallurgical super-sulphated cement, which has been shown by experience to be capable of withstanding attack by dilute sulphuric acid.

This primary lining is specially suited to the stiff London clay in which the tunnels are situated. Each ring of lining consists of a reinforced invert unit, and 19 plain pre-cast segments; the rings are 18 in. wide, 27 in. deep, and built to an internal diameter of 26 ft. 6 in.

The tunnels are driven in 31-ft. diameter shields fitted with hydraulically-operated erector arms for setting the segments in position in the crown of the tunnel. When the face of the excavation has been sufficiently advanced, the shield is pushed forward by propelling rams bearing against the last completed ring of lining, to allow the next ring to be assembled immediately behind the shield. The shackles which attach the tail of the shield to the crane platform are uncoupled and the rams withdrawn. This enables the invert unit to be placed immediately behind the shield.

The lining units are built up on each side to about the horizontal axis of the tunnel during which period the retractable portion of the conveyor is moved forward so that the excavated material can be removed to the hopper. The units above the horizontal axis are then placed on specially designed arms shaped to the inner radius of the tunnel. These arms are hydraulically operated, and the units are placed and pushed up so that they are within a few inches of their final position. The crown unit is carried up in a special hoist and is held in position until completion of the final operation. Jacks are inserted in the recesses in units near the horizontal axis of the tunnel, and each group of segments is lifted upwards until it is in close contact with the clay. The erector arms are then withdrawn and the ring forced back by the propelling rams on the shield to interlock with the preceding ring. The jacks are then further extended to thrust the periphery of the ring against the ground. A dry concrete pinning is placed to each side of the jack and, subsequently, the jacking recess is filled in a similar manner.

### Conveyor System

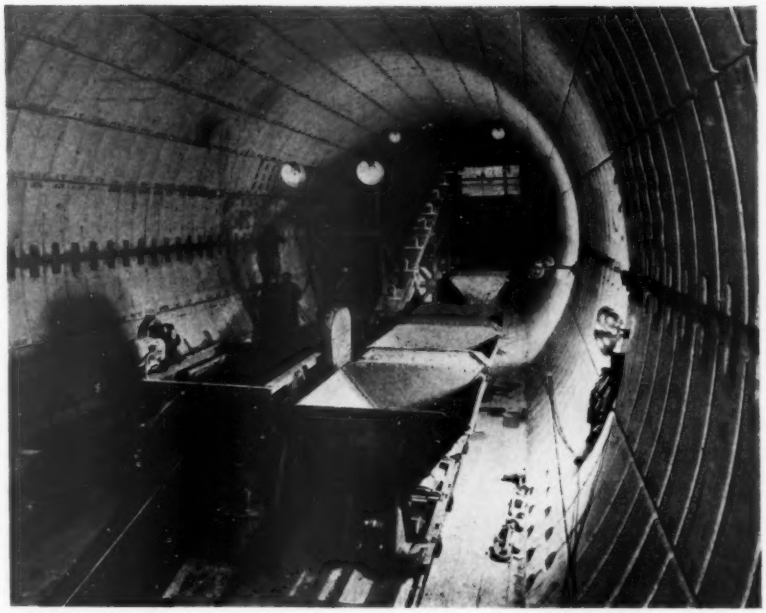
A conveyor takes the spoil from the digging shield and loads it into trains of 2-cu.-yd. capacity wagons hauled by diesel locomotives running on a 2-ft. gauge track; these take the spoil from the tunnel. Men working in the 12 compartments of the shield shovel

*Working face, showing shield and hydraulic mechanism for lifting lining segments into position*

spoil into a chute delivering on to a retractable conveyor, which in turn feeds on to an inclined conveyor from the top of which the spoil is discharged into a hopper and then into wagons for removal from the tunnel.

Two tracks are laid on the conveyor platform. They are cross-connected by a power-operated traverser to transfer wagons from the "empty" to the "full" track, so that a continuous supply of empty wagons can pass below the loading hopper without interruptions for shunting. The same tracks are used for transporting the lining segments to the face of the tunnel.

The shield used for the now complete Hadley North tunnel has been removed and re-erected at the north portal of Hadley South tunnel in readiness for driving. The tunnel portal has been built oversize initially, to permit the passage of the shield, the thrust from the propelling rams being transferred by temporary rings of lining and trestled piles to the ground outside the tunnel.



*Conveyor system removing spoil from tunnel face, showing in the background hopper for direct loading to wagons*

### Earthworks

Earthworks at four separate sites have now been completed to form a widening of the cuttings on the down side of the line. The sites are: Greenwood Signalbox to portal of Hadley South tunnel, 200 yd.; between Hadley South and North tunnels, including Hadley Wood Station, 300 yd.; between Hadley North tunnel and Potters Bar tunnel, 750 yd.; and from Potters Bar tunnel to the point where four tracking has been completed south of Potters Bar Station.

From Hadley Wood Station to Hadley North tunnel, and between Hadley North and Potters Bar tunnels the cutting slope was graded 1 in 4 as a first stage initial cut. During the second operation, drainage counterforts were cut and the grading of the slope altered. At the counterforts the cutting slope is triple graded from 1 in 2·8 at the top of the slope falling to 1 in 4 in the middle section and descending to 1 in 8 at the foot of the cutting. The slope is also graded longitudinally, the highest point about midway between pairs of counterforts is left at the initial gradient of 1 in 4, descending gradually to the triple grading at the counterforts to provide a watershed.

One of the new tracks will run through the site of the present Greenwood signalbox. This box will eventually be demolished and colour-light signalling introduced between New Barnet and Potters Bar.

### Station Reconstruction

At Hadley Wood Station the down side span of the triple-span overline road bridge has been reconstructed to make room for the additional tracks. The new span consists of standard precast, pre-tensioned concrete beams. The widening has necessitated the partial reconstruction of the passenger station. The present down platform will be widened and will become an island platform between the two main lines, and a new down slow platform will be provided. The present up platform will remain as the up slow platform.

The existing buildings at road level and the two existing staircases to the platforms will remain with internal alterations and improvements including the complete modernisation of the ticket office. A new footbridge and staircase will connect the booking hall with the new down slow line platform.

The up and down slow platforms will be provided with new awnings and platform buildings containing waiting rooms, lavatories, and railway staff rooms. The buildings will be centrally heated and washing facilities with hot and cold water will be provided in all lavatories. Additional covered windbreak shelters will be sited in the most convenient positions on up slow and island platforms. The present gas lighting on the station will be replaced by a modern installation which will, however, take into account the rural character of the neighbourhood.

The works between Greenwood and Potters Bar are being carried out under the general direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region. Sir William Halcrow & Partners are the consulting engineers. The contractor for the tunnelling and widening works of the scheme is Charles Brand Limited.

The conveyor system in the tunnel was designed and supplied by the Fraser & Chalmers Engineering Works of the General Electric Co. Ltd.

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NEW CANADIAN PACIFIC SUBSIDIARY.—The Canadian Pacific Railway Company has announced that letters patent have been issued in Ottawa incorporating Canadian Pacific Oil & Gas Limited. The new company is a wholly-owned subsidiary of the C.P.R. Company. The new oil and gas subsidiary was incorporated so that Canadian Pacific may be in a position to take the fullest advantage of opportunities as they may occur for further developing its mineral resources. Its incorporation is another step in furtherance of a flexible policy by Canadian Pacific in the development of its approximately 11·3 million acres of mineral lands in the Prairie provinces with the overall objective of long-term maximum resource development. Canadian Pacific Oil & Gas Limited has power to engage in all phases of the discovery, development, operation and sale of oil, gas and other mineral resources and their products.

PRESERVATION OF RAILWAY RELICS.—A committee representing members of societies in Britain concerned with railways is reported to have asked Sir Brian Robertson, Chairman of the British Transport Commission, for an interview to discuss what it describes as the "present sorry state of affairs" in the preservation of historical rolling stock and other relics of railway history. It proposes five points for discussion: the desirability of instructions to all Regions of British Railways not to destroy, without the authority of the Commission, any item scheduled for preservation; the affixing of metal plates to all larger items scheduled; the setting up of a committee, representing the B.T.C. and other interested bodies, to seek a site for a transport museum; the storing of items intended for the museum where they can be viewed and kept in good condition; and the passing to the curator of historical relics of all drawings and photographs of stock no longer extant.

# British Railways Automatic Train Control System

*Inductive actuation of audible cab signals, with gradual brake application when needed, at approach to distant and multiple-aspect signals*

THE information reproduced below is taken, by courtesy of the Institution of Railway Signal Engineers and of Mr. J. H. Currey, Signal & Communications Development Engineer, British Railways Central Staff, from the paper read by Mr. Currey to the Institution on February 12.

The equipment described is the result of much investigation and extended practical trials on the East Coast main line of the Eastern Region of British Railways; as already mentioned in our columns, it was designed for steam locomotives fitted with the vacuum brake, but adaptations to other forms of motive power and systems of braking are of course being arranged, as part of the general automatic train control programme.

### Track Equipment

The track equipment consists of centrally located permanent magnet and electro-magnet inductors at 2 ft. 6 in. centres, with protecting steel ramp, about 200 yd. on the approach side of the signal, the former passed over first by the train and setting the engine apparatus in action. There is a 1 sec. delay to allow a slow moving train to reach the electro inductor, energised when the signal is clear; this covers speeds down to approximately 1¼ m.p.h.

The permanent inductor is a vertical magnet of Alcomax II, 5 in. high and approximately 9 sq. in. cross section, with steel spreader plates, 10 in. by 5 in., forming an H on its side, all in an aluminium alloy casing above sleeper level.

The electro-inductor, of Swedish iron, with two windings, able to be connected for either 24 or 12 v. operation at 9 watts, is considerably larger but with spreader plates shaped to give a similar flux curve. This unit goes down into the ballast, but the top of the casing is at rail level. Great care has had to be taken to keep the interior dry and free from the effects of vibration. A rigid specification for the impregnation of the coil is required against damp entering the case and the two halves are securely jointed; coil connections to the terminal box are hermetically sealed. However, until more experience can be gained, which must spread over a matter of years, the standard inductors will have their cases filled with petrolatum. Ten dry inductors have been fitted for some time to ascertain if that is necessary. A sealing gland is provided for the cable entry. The increasing use of track cleaning and tamping machinery may render a detachable coupling necessary.

A box to prevent excess ballast from getting under the assembly is desirable. As the apparatus must be capable of being fitted both to timber and various designs of concrete sleepers, and adjustable for differing heights of rail level, the fixing arrangements have been specially designed with this object. The permanent inductor presents a south pole to the locomotive and the electro inductor, when energised, a north. Current for the latter may be provided in any of several ways familiar to signal engineers, to give 12 or 24 v. at the terminals under normal conditions.

The movable part of the locomotive receiver requires a certain time for its operation, reduced in proportion to the magnetic force acting on it, and it must do so before the field of the electro inductor is reached. The magnetic flux therefore must be considerably in excess of that required to operate a stationary receiver, which is approximately 17 Gauss, and a very large margin has been provided, able to deal with speeds up to some 150 m.p.h.

With mechanical distant signals the controlling relay for the electro inductor needs to be energised over a lever contact and an arm contact closed at 25-30 deg., with proving back contact in the "on" side repeater circuit. It is highly desirable to provide full block controls with this equipment. If the semaphore is motor operated the motor relay can control the inductor relay through an arm contact, proving and block controls remaining unaltered.

For colour-light signals—whether

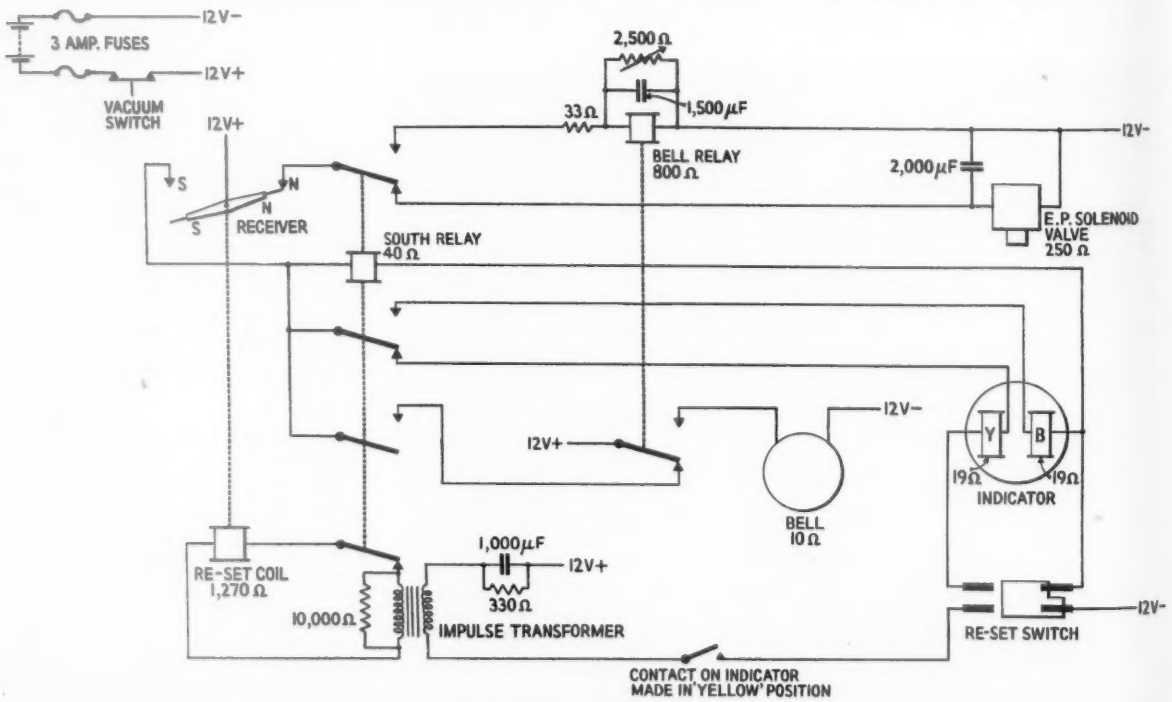



*Diagram of circuits used with British Railways A.T.C. system as applied to steam locomotives*

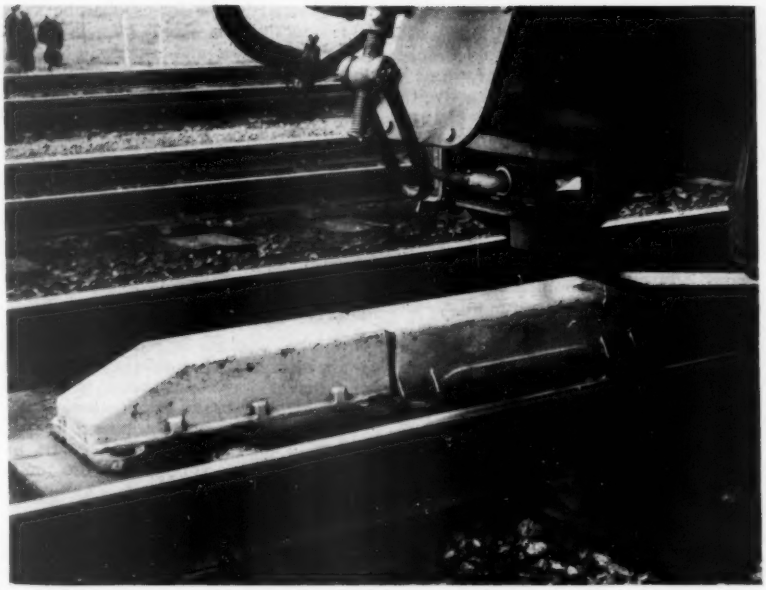
controlled or automatic—appropriate arrangements are easily made, the apparatus giving a warning on the locomotive in all cases unless a green aspect is exhibited. If a line is used for two-way working arrangements will be required to suppress the action of inductors for the time being inapplicable to a particular movement.

### Locomotive Equipment

The receiver, fixed 5 in. above rail level, on rubber mountings, consists of a small permanent magnet pivoted between soft iron laminated pole pieces in magnetic contact with iron collector plates, a 5-in. dia. lower and a 16-in. × 10-in. upper. This armature carries fixed stop pins and a flexible beryllium copper strip with contacts at each end. The unit, including the pole pieces, is in an aluminium bronze frame with adjustable stops for setting armature travel and adjustable contacts. A coil round the lower pole piece resets the armature when required. Five wires, i.e., armature, normal contact, reverse contact and re-set coil, are taken through a sealing gland in the top collector plate to a 5-way socket. The whole, including the lower collector plate, is in a non-magnetic cast iron pot hermetically sealed to the top collector plate.

To enable a fitter to change a receiver quickly, a 5-core hose-protected flexible cable is plugged into sockets on it and on a junction box close to it, all specially designed to keep out water against the pressure achieved at speeds up to 100 m.p.h. and to maintain efficient electrical contact under the violent oscillations to which a bogie carried receiver may be submitted. Spring loaded plungers make contact with fixed studs and the rims of the cable plugs are screwed by heavy retaining rings on solid rubber to form a hermetic seal. With the receiver on a bogie frame the junction box is on the main frame and the flexible cable allows 10 in. relative movement each side of normal. A cable in conduit leads to the relay junction box.

*Driver's control unit, showing acknowledging handle and indicator denoting a warning has been received and silenced*



*Engine receiver passing over inductors on track on the approach side of distant or multiple aspect signal*

Connection between various conduit lengths and between conduit and apparatus is by rubber hose and jubilee clips to avoid corrosion in screw threads and give flexibility free from joint strain. The relay junction box, with relay unit cast integrally, has spring plungers connecting with studs when the lid is bolted. A flexibly mounted tray carries the relays, condensers etc., shown on the accompanying diagram, for translating the receiver signals into cab indications and effect braking. When closed the unit is proof against the fireman's steam washing down hose. A vacuum switch serves to economise battery when a locomotive is not in service.

### Driver's Control Unit

The driver's control unit has a solenoid-operated semi-rotary vacuum valve which, when the solenoid is energised, connects the warning horn to atmosphere and the brake valve to main vacuum reservoir. The armature holds up on 12 V. but when de-energised reverses the valve ports, connecting the horn to reservoir and the brake valve to atmosphere through a small bleed hole, bringing the warning and gradual brake action into operation after the 1-sec. delay already mentioned. The armature will not pick up again even if as much as 100 V. are applied to the solenoid. The driver has to reset it, in acknowledgment of the warning, by pulling down the handle seen on the right of the unit, in our illustration. (Coupled to this is a valve attachment admitting air to the brake valve, rendering it impossible to maintain the handle down irregularly and cut the equipment out of action.)

On the front of the unit is a circular indicator, operated by a rotary permanent magnet armature, displaying an all-black dial or alternate black and yellow spoked stripes immediately the re-setting handle is pressed and serving as a reminder that a warning has been acknowledged. (The all-black condition is reproduced on reaching the next signalling location.)

The solenoid valve, valve block and resetting handle spindle with contact assembly are mounted on a single chassis so that adjustments may be carried out in servicing shops before the equipment is fixed in its casing. This chassis also carries a six-way socket. When the unit is closed up, the socket is accessible through the door on which a six-way plug bolts into position. A short length of stainless steel flexible tubing connects the plug to conduit to carry a six-core cable to the relay junction box. Stainless steel is used here as the driver's control unit is usually mounted on the boiler front with the re-setting handle within easy reach and the indicator facing towards him.

The bell is very powerful, to overcome the high level of noise in a steam locomotive cab. The hammer shaft guide is sealed against corrosive atmosphere by rubber bellows. The horn is of diaphragm type operated by vacuum.

The 32-amp.-hr. battery is housed in a steel compartment with fuse box at the side; quick release tags moulded in to cable connect the battery terminals to fuse box terminals and the two five-cell crates in series. The battery is changed for charging every four or five weeks; the overhaul period is five years.

The brake valve has two chambers, separated by a rubber diaphragm. The lower is connected to the vacuum supply through the electro-pneumatic valve in the driver's unit and to a small timing reservoir. The upper is in direct connection with the train pipe, and isolated from atmosphere by a valve coupled to the diaphragm, under normal conditions in balance; there is equal vacuum on both sides and the valve is kept closed by a light spring. When the electro-pneumatic valve is de-energised, air is admitted to its underside through a small orifice and after a second or two it becomes sufficiently unbalanced to lift, taking the valve off its seating. Air rushes into the upper chamber and the train pipe, tending to balance the diaphragm again, but air is still entering the lower chamber so that after a few oscillations the diaphragm takes up a position where the rate of drop of vacuum in the train pipe equals that in the lower chamber. As this is controlled by the capacity of the timing reservoir and the size of the air orifice, it is constant and consequently the rate of drop of vacuum in the train pipe is constant, regardless of the length of train, up to the maximum capacity of the brake valve. Allowing for the longer propagation time of air down a long train it might safely be said that from a light engine up to a 12 coach train, the total time to destroy the vacuum in the train pipe is 13 to 15 sec. with a further 3 or 4 required for trains up to 16 coaches.

The non-return valve ensures a supply of vacuum being retained in the main reservoir to sound the horn should the driver have destroyed train pipe vacuum by a brake application.

(Sealed isolating equipment is provided to enable the A.T.C. to be put out of operation should a failure render that essential.)

### Circuits and Operation

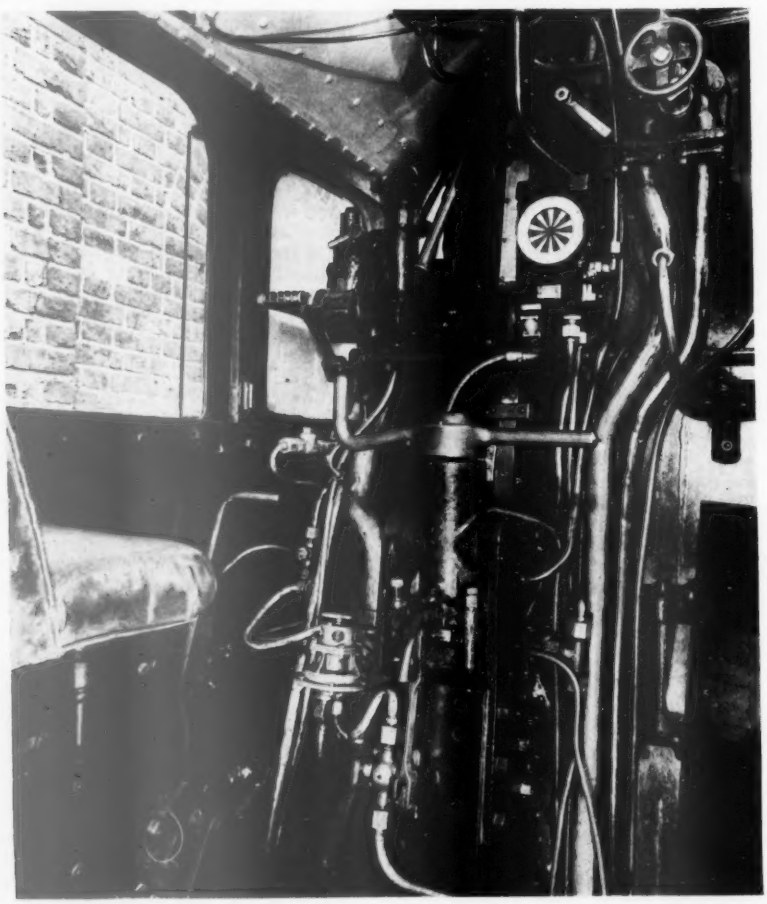
The circuits, receiver, relays, and so on, are shown on the accompanying diagram. The method of operation is as follows:—

When running between signals the receiver armature is lying with its north contact made. Current is therefore fed to the electro-pneumatic valve and also charges the 2,000 m.f. condenser across its coils. When, at the approach to a signal, the receiver passes into S polarity magnetic flux at the permanent inductor, the armature reverses, opening its N and closing its S contact. The supply to the e.p. valve is cut off but its armature does not drop away for 1 second owing to the discharge of the condenser. The closing of the receiver S contact picks up the south relay and current is passed through the "black" coil of the indicator.

If the distant signal is clear and the receiver reaches the N polarity magnetic flux of the now energised electro inductor within 1 sec. (equivalent to a speed of $1\frac{1}{4}$ m.p.h. or over), the receiver armature will be turned back to normal, restoring current to the valve before it has dropped away. The south relay will remain energised through its stick circuit. With the receiver normal and that relay energised, the bell relay picks up, ringing the bell; the breaking of its back contact cuts the stick circuit of the S relay which drops away, in its turn disconnecting the supply to the bell relay, which, however, remains energised for 2 seconds by the discharge of its 1,500 m.f. condenser, when it drops away also and the circuit is restored to normal.

If the distant signal is "on," however, the electro inductor is dead and 1 sec. after entering the field of the permanent inductor, the e.p. solenoid becomes de-energised, operating its valve to sound the horn and apply the brakes. Pressing the re-set handle on the driver's control unit disconnects the S relay which, when its armature has dropped away, puts current through the "yellow" coil of the indicator. When that has turned to yellow a proving contact on the flag is made and current passes through the primary of the impulse transformer. This induces a high voltage impulse in the secondary which passes through the re-set coil on the receiver bottom pole piece, magnetising this in such a direction that the armature is returned to normal. The current is then cut off from the yellow coil of the indicator and restored to the e.p. valve to hold it normal, silencing the horn and preventing or restoring any brake action. On releasing the re-set handle, current is cut off the primary of the impulse transformer, which induces a current in the secondary in the opposite direction to the first impulse, tending to operate the receiver again.

To prevent this and reduce the arcing at the re-set contacts, a 3,500 m.f. condenser is included in the primary circuit. When that is made the condenser charges up rapidly, reducing the current to a few milliamperes. The current induced in the secondary is consequently far too small to operate the receiver. This gives the 17 V. necessary to operate the resetting, and prevents a possible wrong side failure should the S contact wire in the receiver cable come into irregular contact with one of the re-set coil wires.



*Cab arrangement on class "A4" locomotive "Sir Nigel Gresley" showing driver's control unit with reminder indicator exhibited*

# ELECTRIC RAILWAY TRACTION SECTION

## Electric Locomotives for New South Wales

DESPITE the high outputs now obtained from four-axle electric locomotives, the extension of electrified services over lines with gradients of 1 in 50 and steeper will continue to call for six-axle designs irrespective of the system of electrification chosen. The powerful Co + Co locomotives of Class "46" for the New South Wales Government Railways described in the following pages are an example of the latest developments in d.c. practice allied with appropriate mechanical design to meet severe service requirements. Construction has been shared by the Metropolitan-Vickers Electrical Co. Ltd. for the electrical equipment, and Metropolitan-Vickers—Beyer, Peacock Limited for the mechanical parts and erection; and the locomotives were supplied to the railway administration through Australian Electrical Industries Pty. Ltd., Sydney. With a one-hour rating of 3,780 h.p. and a continuous rating of 3,440 h.p., they are the most powerful electric locomotives yet built in this country.

The design originated with a prototype locomotive built by the New South Wales Government Railways to obtain operating experience with a machine of the general type envisaged for use on the Parramatta-Lithgow electrification extension. Electrical equipment for the prototype was supplied by the Metropolitan-Vickers Electrical Co. Ltd. in 1946, and the 40 locomotives ordered subsequently incorporate many features of the prototype combined with improvements based on service experience. The westward extension of electrification from Parramatta, the previous terminus of the Sydney suburban electrification, was opened in stages between 1955 and 1957; the completion to Lithgow last year was recorded in our August 2, 1957, issue. Beyond Penrith the line climbs through the Blue Mountains with many gradients of 1 in 33 and an average gradient of about 1 in 50 for 30 miles with sharp curvature; the route rises to a maximum of 3,500 ft. in 32 miles. Lithgow, at the western end of the electrified section, is a coal mining centre and there is considerable coal traffic down into Sydney, besides general freight. The electrification has been continued on the 1,500-V. d.c. system used in the Sydney suburban area, and the arduous duty required on the mountain section of the main line has resulted in various features being embodied in the electrical design of the locomotives which illustrate the capacity of modern d.c. practice to provide highly flexible operating characteristics.

The retention of d.c. on the main line has enabled regenerative braking to be used in circumstances where its advantages are likely to be marked. While experiments are being carried out with the operation of locomotive rectifiers as invertors, to allow regeneration on a.c. systems with rectifier motive power, much development remains to be done, and the absence of regenerative facilities may for some time count against the adoption of a.c. traction where certain combinations of circumstances exist. Regeneration is available in the New South Wales locomotives in two of the three motor groupings. With the motoring connection, no fewer than 18 running speeds are available, five weak-field steps in each grouping being obtained by means of diverter resistances in series with inductive shunts. This wide speed range, comparable with that of locomotives such as the French National Railways "7100" class, is obtained without the use of compensating windings to assist commutation at the lower field strengths. It is a measure of advance in d.c. motor practice since the war that the use of these windings, which complicate maintenance to some extent, is diminishing and that in certain locomotive classes where compensated motors were used in the earlier units, they have been omitted in later examples.

The resistance notching of the new locomotives is finely graded; 20 steps are provided. A variation from familiar practice is the method of forced-ventilating the resistances; the eight motor-driven axial flow fans used for this purpose are supplied from the exciter-generator. This machine is energised at constant value while starting, but the motors do not run until the resistances have been in circuit for one min.; a time-delay is imposed to prevent operation for very short periods such as might occur during shunting movements. The same delay system keeps the fan motors running for three minutes after the resistances have been cut out of circuit, ensuring that they are thoroughly cooled after every period of prolonged use. During regeneration the fans operate continuously, but their speed is controlled according to the degree of excitation selected for the traction motor fields. Three locomotives combine to provide regenerative braking power on 2,200-ton trains descending the steepest section of the line.

The Co + Co wheel arrangement has been adopted for its advantages in handling the very great forces involved when locomotives are operating in multiple, and the method of articulation is arranged to assist in the negotiation of curves. Tandem mounting of the motors, with their noses towards the locomotive centre line, has been adopted in order to minimise the tendency to weight transfer. Without radical departure from established practice, the whole design exhibits the development of d.c. locomotive technique and will maintain British reputation in this still important field.

## Dual Frequency Locomotives

EUROPEAN railway administrations are well aware of the possibility that junctions between low-frequency and industrial-frequency systems, such as that at Basle, may increase in number. The interest now being taken in this subject is reflected by the decision to show a dual-frequency locomotive of the Austrian Federal Railways at the forthcoming Brussels International Exhibition. This is a Bo-Bo of 2,800 h.p. with tandem-armature motors similar to the design illustrated on page 662 of our June 10, 1955, issue, although the builder of the electrical parts in this case is Elin A.G. As in the recent French National Railways prototypes for dual-frequency working, mentioned in our March 15, 1957 issue, no adjustment of the main transformer connections is made when changing from one frequency to the other, as the higher voltage of 50 c/s is balanced by the increased impedance of the winding in these conditions, but the interpole shunts are modified automatically by the operation of a relay. The locomotive has completed some four months of successful running on the 50-cycle Hollental line of the German Federal Railway, and has since returned to Austria, where it has been working between Vienna and Passau and on the Tauern line.

Another recent dual-frequency design has given the opportunity for service tests of a new method for improving the commutation of 50-cycle motors. This is a 600-h.p. locomotive of the metre-gauge Alb Valley line (Karlsruhe to Herrenalb and Ittersbach) in Germany, on which supplies of 25 c/s and 50 c/s are used. The Brown-Boveri traction motors incorporate a form of split brushes which, in conjunction with two inductive current dividers for each motor, serves to minimise the effect of the transformer e.m.f. by causing a compensating current to flow in the armature coils. This current varies with the traction current and the speed of rotation, under the influence of the inductances. It is claimed that with this arrangement a transformer e.m.f. of 4·9 volts is permissible at the one-hour current rating and of 5·8 V. at starting; these values are higher than could be admitted otherwise without resorting to resistive connections to the commutator.

# New South Wales Railways Mixed-Traffic Locomotives

*Flexible operating characteristics in 3,780-h.p. design for heavily-graded route*

*By E. T. Bostock, B.Eng., A.M.I.E.E., M.I.Loco.E., and D. A. Hawkins, B.Sc., Grad. I.E.E.*

ELECTRIFICATION of the New South Wales Government Railways began in 1926 with the suburban system around Sydney, which now extends to about 120 route-miles; it is operated on the overhead system at 1,500 V. d.c. by multiple-unit stock. Since the second world war, the two major features of the modernisation of the motive power and rolling stock of the N.S.W.G.R. were the purchase of diesel-electric locomotives and the decision to extend the 1,500-V. electrified system along the Western line from Parramatta, the previous limit of the suburban system, to Lithgow and to operate this with the 40 electric locomotives known on the N.S.W.G.R. as the "46" class. The Parramatta - Lithgow electrification was inaugurated last summer, as mentioned in our issues of July 5 and August 2. All services to Lithgow are worked by the electric locomotives.

In conjunction with the electrification there is also in progress an extensive programme of track doubling so as to deal with the increasing traffic, much of it caused by housing development in the outer suburbs of Sydney. The track profile is very gently undulating for about 35 miles out of Sydney to Penrith; here the line starts to climb the Blue Mountains, with many gradients of 1 in 33 and with an average gradient of about 1 in 50 for 30 miles with many sharp curves, rising to a maximum of 3,500 ft. in 32 miles. The electrification of the mountain section has made possible heavier trains and higher speeds.

The leading particulars are:—

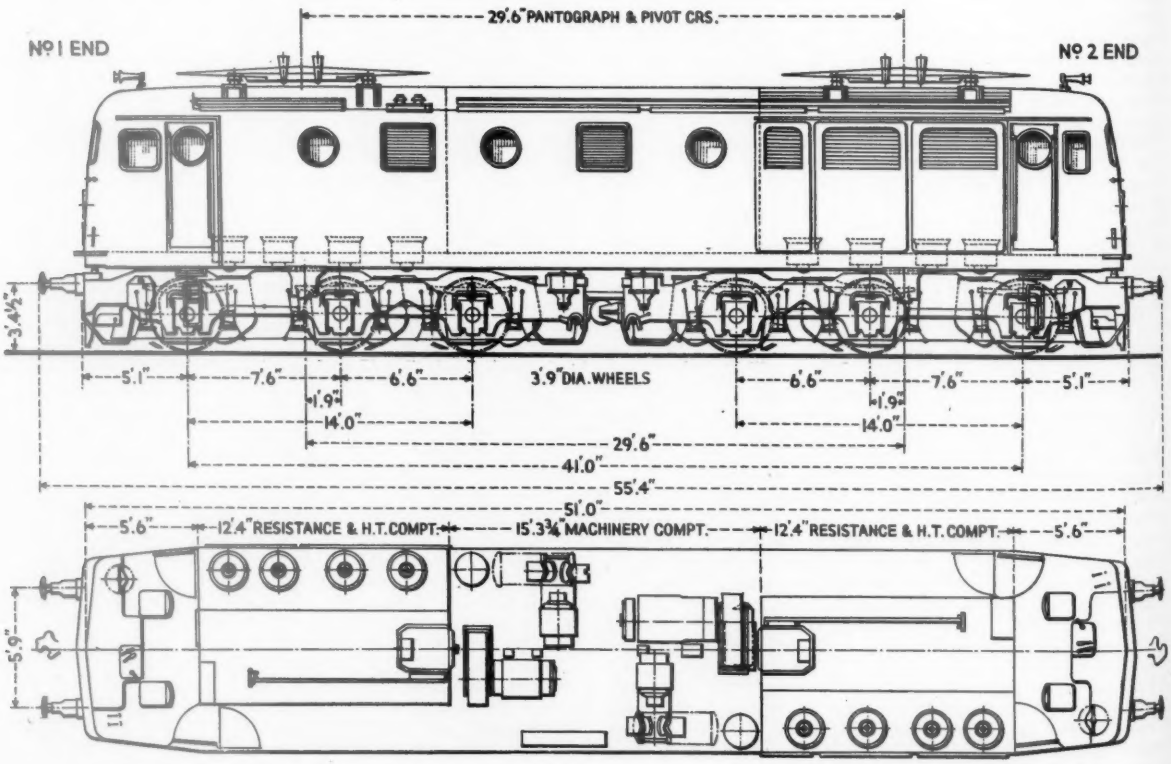
| | |
|---|---|
| Gauge | 4 ft. 8½ in. |
| Wheel arrangement | Co – Co |
| Weight in working order | 108 tons |
| | ft. in. |
| Length over buffers | 55 4 |
| Bogie wheelbase | 14 0 |
| Total wheelbase | 41 0 |
| Distance between pivot centres | 29 6 |
| Width over body | 9 7 |
| Height from rail level to pantograph (down) | 14 6 |
| Wheel dia. | 3 9 |
| Tractive effort at 25 per cent. adhesion | 60,500 lb. |
| Maximum service speed | 70 m.p.h. |
| Minimum curve radius | 330 ft. |

The contract for the "46" class locomotives was placed at the end of 1950, and close liaison was maintained with the builders by the railway officers during design and layout, as it was desired that as much as possible of the experience gained with the prototype locomotive should be incorporated.

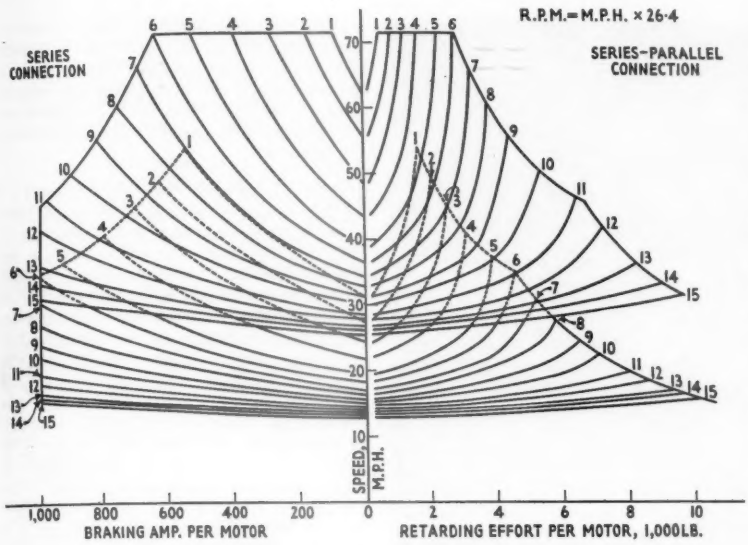
The electrical equipments were manufactured by Metropolitan-Vickers at Trafford Park and Sheffield. The mechanical parts were made and erection was carried out by Metropolitan-Vickers – Beyer, Peacock, Limited, at Stockton-on-Tees.

Primarily because of the coal traffic from Lithgow to Sydney the heaviest trains are those making the descent of the Blue Mountains; locomotive performance thus has been determined primarily by the regenerative braking requirements. Double-headed trains of 2,200 tons can be hauled downhill; a third locomotive is added for extra braking assistance over the steepest section between Katoomba and Valley Heights. The locomotives are designed for multiple-unit operation from any driving cab.

The graph on page 193 shows the performance characteristics of a single motor when in regeneration at a line voltage of 1,600. Both series and series-parallel groupings of motors can be used; with a large number (15) of traction motor field excitation notches an extensive choice of braking speeds is available.




*General arrangement and layout of 1,500-V. electric locomotive for New South Wales Government Railways*




*Single motor test regeneration characteristics at* 1,600 *V., with gear ratio of* 19 : 67 *and* 45 *in. dia. wheel*

The equipment is designed for three motor groupings, both for full field and five stages of field weakening. There are, therefore, 18 economical running notches. Twenty resistance notches are provided on the master controller in order to keep the tractive effort at the notching peaks within the wheel adhesion limitations when accelerating heavy trains from rest.

The maximum speed of the locomotives in service is 70 m.p.h.

### Underframe and Body

The underframe is of riveted construction. It consists basically of four longitudinal channel members with substantial transoms at the pivot centres, with other transverse members to strengthen the whole structure and provide support for the platform plate, body, and equipment. The inner pair of longitudinal channels have cover plates top and bottom; the space inside forms the main air ducting for the forced ventilation of the traction motors. The air is conveyed from the duct to the motors through short telescopic steel ducts attached to the traction motors. These are spring loaded upwards to maintain a large flange in contact with the outlet in the main duct. Vertical movement of the motor relative to underframe is accommodated by the springs and lateral movement by sliding of the top flange, Ferodo liners being fitted to control wear.

The body is equipped with a driving cab at each end, there being an entrance door on each side. Immediately behind each cab is a high tension and resistor compartment with door safety interlocking gear. In the centre of the body is the machinery compartment, access to this being obtained from either cab along a corridor beside the H.T. compartments. The two H.T. and resistor compartments are almost identical in layout each containing basically the control apparatus for three of the six traction motors together with the inductive shunts for field divert of the traction motors.

The resistors are force-ventilated automatically during starting and during regeneration by means of motor driven axial flow fans; there are four per compartment mounted in the floor under the resistor frames. The machinery compartment houses two motor-generator sets, one to provide the 120-V. low-tension supply and the other for exciting the traction motors during regeneration. The compartment also contains two Westinghouse type 2C7SL motor-driven air compressors, the motors being 1,500-V. machines which drive through flexible couplings; there are also a number of items of brake equipment, and the battery.

Each motor-generator set has a centrifugal fan, mounted on a shaft extension, discharging into the main air duct to provide the forced ventilation of the traction motors. Normally each fan supplies the three motors at its own end of the locomotive but in an emergency all six motors can be supplied, at a reduced flow, from one machine. Tappings taken from the outlet of each blower provide a small supply of air which is passed over the inductive shunts and then through viscous type filters into the H.T. compartments which are thus pressurised against the ingress of dirt through minor leakage points.

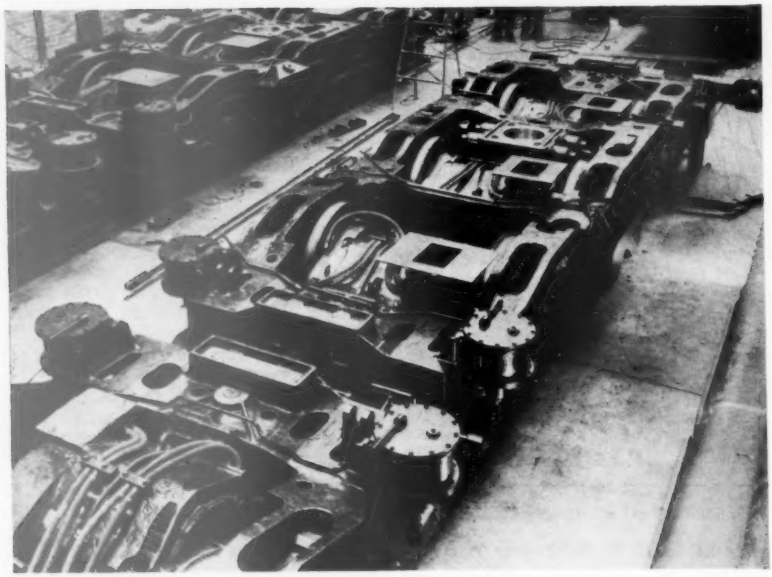
The body plating is attached to a welded framework by cold riveting. Sections of the roof above the machinery compartment are removable. Doors are provided on the outside of each resistor compartment to facilitate the removal of equipment.

Ventilators on the shoulders of the body run the full length of the roof and serve to ventilate the resistor compartments, machinery compartment and corridors.

### Bogies and Running Gear

The two three-axle bogies are fully interchangeable and are articulated at their inner ends. Side buffers and an automatic centre coupler are fitted to the bogies. The N.S.W.G.R. is in process of changing over from the use of buffers with central screw couplers to the central automatic coupler. With the coupler and buffers mounted on the bogie, and not on the under-

*Metrovick* 3,780-*h.p. Co-Co* " 46 " *class electric locomotive*



*One-piece steel casting three-axle bogies, for locomotive, showing articulating joint at inner ends*

frame, all draw and buffing forces are taken through the bogies and articulating joint, so relieving the body and underframe construction of these forces. This is of advantage in multiple-unit working.

The bogie frames are one-piece steel castings, the side and transverse members being of heavy box section.

The pivots on the underframe rest in flat relineable housings on the bogie castings. To minimise the possibility of heavy thrust, transverse movement of the housing (and therefore of the body) relative to the bogie is permitted to the extent of $\pm \frac{1}{4}$ in. under the control of pre-loaded helical springs. In addition, the pivot housing on one bogie is given a certain amount of free longitudinal movement to accommodate the slight closing up of bogie centres which occurs when negotiating curves, due to the articulation of the two bogies.

The articulating device between the inner ends of the two bogies consists of two elements: first, a simple draw-link with a spherical bushed joint at each end which transmits little or no lateral force between one bogie and the other; and, secondly, a device which is in essence a spring-loaded bracket and fork arrangement. This normally constrains the bogies so that they make equal but opposite angles relative to the underframe and thus assists in the negotiation of curves.

The pivot centres together carry only 75 per cent of the body weight. The rest is borne on rubber resilient end bearers disposed one at each end of each bogie on the longitudinal centre line.

A side bearer is disposed on each side of each bogie on the transverse centre line to limit body roll. Spoked wheels with shrunk-on tyres are used and provision is made for the removal from the axle of the road wheel remote from the gear wheel end by the injection method. The wheel at the gear end has the hub extended to form a seating on to which the gear wheel is pressed. Thin flanged tyres are used on the centre axles.

Axleboxes are of the SKF spherical roller bearing grease-lubricated type. They are fitted with inner and outer flanged lips to locate them transversely. Renewable manganese steel liners are fitted to these lips and to the front and back faces and these slide on similar liners on the bogie horn cheeks.

The spring system consists of a laminated spring at each wheel position on the axlebox augmented by helical auxiliary springs on each spring hanger. Each wheel group is fully equalised within itself by means of compensating beams.

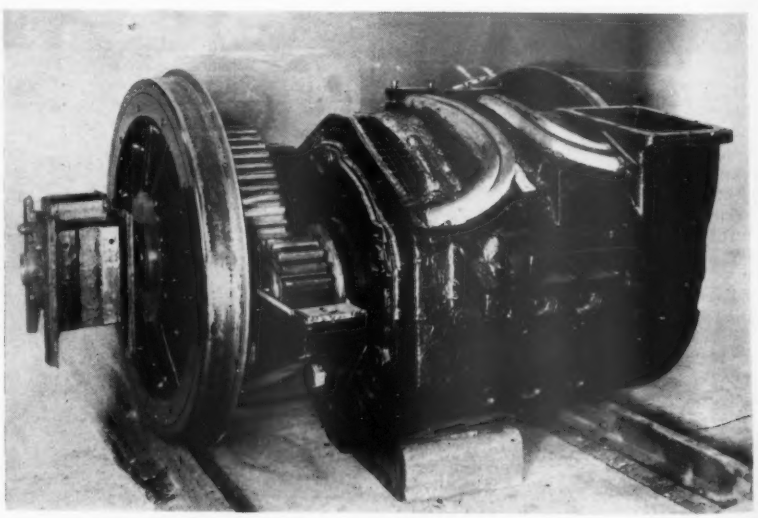
### Traction Motors

The three traction motors of each bogie are axle-hung and mounted in tandem, with nose ends towards the centre line of the locomotive. This arrangement minimises the transfer of weight from axle to axle caused by the torque reaction of the motors when exerting tractive effort. Each motor is supported at one end by two sleeve bearings on the driving axle and at the other end by a rubber/steel sandwich arrangement embracing the nose. A resilient rubber bushed lateral link is fitted between the motor frame and the bogie side frame to prevent "side-slog" of the motor on its axle bearings and yet permit free vertical movement.

The motors are six-pole, force ventilated. They operate at nominal voltages of 242, 483, and 725, depending on the motor combination in use, but these figures are liable to considerable variation because of line conditions. For higher speed operation at each voltage the motor field is weakened by diversion with an inductive shunt and resistance in series. The armature is supported by two roller bearings, and is located axially at the commutator end.

The main poles and interpoles are built up from steel laminations, with windings formed from copper strap. All insulation is of class "B," and the motor ratings on full field to B.S. 173/1941 when force ventilated with 2,500 cu. ft. of air per min. are:—One hr., 725 V., 705 A., 915 r.p.m., 630 s.h.p.; Continuous, 725 V., 640 A., 945 r.p.m., 573 s.h.p.

The motor drive is taken through single reduction straight spur gears



*Six-pole force-ventilated axle-hung traction motor; note spoked road wheels*

with a ratio of 19:67; the road-wheel dia. is 45 in. when new. The pinion is keyed and shrunk on the armature shaft extension, and is arranged for removal by oil injection. The gear-wheel is of the rubber resilient type.

### Auxiliaries

The auxiliary service requirements of the locomotives are met by: (*a*) Motor-generator-blower set, supplying current at 120 V. d.c. for control, lighting, heating and battery charging; (*b*) Motor-generator-blower set, supplying direct current at variable low voltage for traction field excitation for regenerative braking; (*c*) Two motor-driven compressors, supplying air at 140 lb./per sq. in. for locomotive and train braking, control, pantographs, horns, sanding, and window wipers; (*d*) Eight motor-driven axial-flow fans, for forced ventilation cooling of the main resistors.

The generator of the supply motor-generator set has a continuous rating, for class "B" insulation of 5kW. at 42 A., 120 V., when running from a 1,450-V. supply with a 3-ohm protective resistor in series. In these conditions the motor runs at 1,300 r.p.m. and develops 23 h.p.; most of this power is absorbed by the fan.

Both motor and generator are four-pole machines carried on a common shaft and with a combined frame. The set is self-ventilated; narrow blades are built into the back of the blower fan at the generator end.

The motor of the exciter motor-generator set is continuously rated at a higher voltage of 1,750, with a 1·66-ohm protective resistor in series, in view of the generally raised voltages when regenerative braking is in use. The generator has a continuous rating of 79 kW., 1,280 A. at 61·5 V., and at this output the motor develops about 139 h.p. These figures, which give temperature rises in accordance for class "B" insulation, all apply at a machine speed of 1,520 r.p.m.

Again, motor and generator are both four-pole, with a common shaft and frame. In view of the wide variations in load, depending on the degree of regeneration in use, the motor has a speed-stabilising winding, energised from the generator of the supply set. The machine is self ventilated, in the same manner as the supply generator set.

During regeneration, when the line may be at about 1,900 V., an 11·25-ohm. resistor is connected in the common negative from the two motors. Each compressor has a swept volume of 75 cu. ft. a min. when running at 1,000 r.p.m. and a free air delivery of 52·5 cu. ft. a min. The compressor is a two-stage twin-cylinder machine with cylinders in the form of a 90-deg. vee. Lubrication of the bearings is by oil, fed under pressure from a gear type pump at the coupling end. The compressors normally run under the control of an air-operated governor. This cuts out the compressors when the main reservoir pressure has risen to a pre-selected pressure, and starts them when pressure has fallen by a given extent.

Provision is made for the forced ventilation of the main resistances by eight motor-driven axial flow fans. These motors are continuously rated for operation at 50 V., under which condition they each develop 1 h.p. at 1,950 r.p.m. At this speed the fan delivers 4,000 cu. ft. of air a min. at 0·75 in. water gauge. The motor is a two-pole series-wound, totally enclosed machine, fitted with its shaft vertically. The fan is mounted on the motor shaft extension, and draws air from below the locomotive over the motor, through circular trunking, and discharges into the resistor compartment. Air leaves these compartments through roof ventilators.

These motors are supplied from the exciter generator, which produces a varying voltage, depending on the notch in use, during regeneration. Thus the fans run whenever the locomotive is regenerating.

When starting in motoring, the exciter generator field is energised at a constant value to supply the fan motors. As the accelerating resistors may sometimes be in circuit for very short periods of time, as during shunting operations, a time-delay device is fitted. This delays the energising of the exciter generator field until the resistors have been in circuit for one min., and keeps the fans running for 3 min. after the resistors have ceased to carry current. This ensures that the resistors are thoroughly cooled after every period of prolonged use.

A lead acid battery of 55 A.-hr. capacity at the 10-hr. rate supplies the control equipment and lights when the supply motor generator set is not running, as when the locomotive has been lying over between duties.

### Control Equipment

Control is on the series-parallel system. In each grouping the accelerator resistors are connected in series with the groups of motors, and cut out by contactors as the currents fall. Traction motor field weakening greatly increases the number of economical running notches.

In regeneration only the series and series-parallel combinations are employed, and the traction motor fields are separately excited by the exciter-motor-generator. Both the excitation and armature currents are passed through a stabilising resistor which compensates automatically for line voltage variations. Control of the degree of braking in each combination is effected by varying the strength of the exciter generator field.

A differential relay, a no-current relay, an over-voltage relay and a surge-diverter, and overload relays in each motor branch, protect the equipment against voltage and current surges and earth faults.

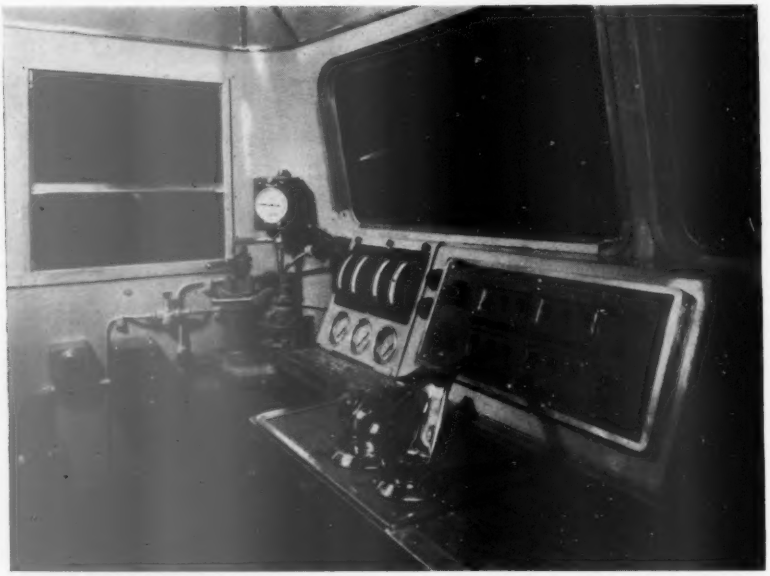
Power is collected from the overhead line by two double-pan pantographs and taken to an isolating switch in one of the H.T. compartments and then to the switchgroups. The switchgroups are housed in two H.T. compartments, one at each end of the locomotive, and are accessible from the respective cabs. Interlocking gear is fitted to the doors so that they can only be opened when the pantographs have been lowered and the positive side of the equipment earthed. The main resistors in the high-tension circuits are mounted in two resistor compartments adjoining the high tension compartments. These compartments are laid out to permit natural or forced ventilation of the resistors.

Three stages of insulation in series separate to live portions of these resistors from earth. From the main isolating switch which is controlled by the door interlocking gear, current is taken through one coil of a differential relay to the line switches, and then to switches which determine the number of resistance branches to be employed, this being equal to the number of motor branches. From the resistors the current passes through the coils of the overhead relays to the motor armatures and the contactors which control the motor combinations, through the reversers to the motor fields, and then to the running rail earth through the second coil of the differential relay and a no-current relay. A further group of contactors makes the necessary connections for regenerative working, connecting the stabilising resistor and exciter. To enter regeneration, motor field excitation is adjusted so that the voltage on the line side of the motors is approximately equal to the line voltage. The line switches are then closed, connecting the motors to the line, and the series resistances cut out.

The traction motor field weakening contactors connect the divert resistances across the traction motor field, inductive shunts in the divert circuits ensuring equal fluctuations in both field and armature currents under transient conditions. The two electro-pneumatically operated reversers are drum switches operating off-load which reverse the connections to the traction motor fields.

The two motor generator sets are controlled by electro-pneumatic contactors; one for each machine acts as a main isolator. The main H.T. auxiliary fuse, and fuses for the motors of the supply motor-generator set and the compressors, are also mounted in the H.T. compartment. The two compressor motors are connected to the 1,500-V. supply by electro-magnetic contactors. When there is no compressed air on the locomotive, a pantograph can be raised by using a small hand pump. The compressor governor contacts control the two compressor contactors, and the compressor controls are synchronised so that when locomotives are running in multiple-unit the compressors on all the units start and stop together.

The low voltage supply for control, lighting, heaters and battery charging, is taken from the supply motor generator set. Battery charging is con-



*Driving position at left hand side of cab of N.S.W.G.R. locomotive*

trolled by a polarised relay. Contacts on this relay make or break the battery contactor coil circuit, connecting or disconnecting the battery and generator.

### Cab Equipment

The cabs are identical, with the driver's seat on the left and the assistant's seat on the right. On the driver's left is the brake control pedestal, on the top of which are the automatic and independent air brake valves.

To the right of the driver is the master controller. This has three controls, the reverse and combination shaft, the mainshaft, and the regeneration shaft. The two latter shafts have permanent handles, and are locked in the "off" position when the reverse shaft is also in this position.

The reverse shaft cannot be moved to "off" when either of the other shafts is not at "off," and the regeneration shaft is locked at "off" when the mainshaft is not. The regeneration handle is kept in this position when the locomotive is motoring normally.

The reverse and combination shaft is moved by a removable key, which can only be moved or inserted when the shaft is at "off" and is held captive when the shaft is in a running position. The reverse key thus locks the whole controller. It also has to be used to open the main isolating switch when it is desired to enter the high tension compartment. Each cab contains a control key switch, which controls the supply to the master controllers. This switch is operated by a removable key which is held captive in the "on" position, and one switch must be closed before a locomotive or group of locomotives in multiple unit can be brought into use. Tumbler switches in the cab control various internal and external lights, the motor-generators and the cab heaters and food heaters, and push-buttons provide overload and over-voltage resetting and pantograph control. Instruments immediately in front of the driver, below the window, are line and motor voltmeters, for use in matching voltages on entering regeneration, and traction motor field and armature current ammeters, which give further guidance to the driver particularly during regeneration, while two duplex air gauges indicate the state of the air brakes on the locomotive and train.

### Brake Equipment

The locomotive is compressed-air braked by the Australian Westinghouse type A-7-EL system. All wheels have clasp brakes operated through equalised brake rigging by four vertical brake cylinders mounted two on each bogie on the inner ends. Air-operated slack adjusters are incorporated in the rigging which automatically make small adjustments for wear of the brake shoes.

The brake is controlled by two handles at each driving position one, the independent handle, for the locomotive brake, and the other, the automatic handle, for the train brakes. The driving position is shown in the accompanying illustration.

Operation of the former applies the locomotive brakes alone while operation of the latter actuates the train brakes and, if required, the locomotive brakes also.

### Performance

The monthly mileages, of 5,000-6,000 per locomotive, are at present fairly low; but they are expected to increase appreciably as the services are extended. The present service from Sydney to Lithgow is being worked entirely by 29 locomotives, with cuts in schedules of 1 hr. for passenger and 2 hr. for freight trains.

The principal sub-contractors were:

| | |
|---|---|
| Air compressor for brakes | Westinghouse Brake & Signal Co. Ltd. |
| Brake equipment .. | Westinghouse Brake (Australia) Pty. Ltd. |
| Battery .. .. | Erf Batteries (Pty.) Ltd. |
| Bogie castings .. | English Steel Corporation Limited |
| Lightning arrester .. | British Brown Boveri Limited |
| Lightning arrester condenser | Westinghouse Electric International Company (U.S.A.) |
| Headlamps .. | J. Stone & Co. (Deptford) Ltd. |
| Axleboxes .. .. | Skefko Ball Bearing Co. Ltd. |
| Filters .. .. | Air Maze Limited |
| Resistors .. .. | British Thomson-Houston Co. Ltd. |
| Speedometer equipment | Hasler Telegraph Co. Ltd. |
| Windows .. .. | Beckett Laycock & Watkinson Limited |
| Fans .. .. | Keith Blackman Limited |

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L.M.R. Cash Awards for Gaining Traffic.—The cash award scheme for securing more goods and passenger traffic to rail, introduced by British Railways, London Midland Region, is reported to have brought over 50 suggestions from the staff. The awards have gone to engine drivers, signalmen, a wagon repairer, porters, checkers, clerks, and foremen. A condition of the scheme is that the suggestor should not be engaged on securing business as part of his or her normal duties.

Scottish Region Travelling Showroom.—A 60-ft. coach has been specially fitted out at the Cowlairs Works of British Railways, Scottish Region, to display toys, fancy goods, and similar articles. The vehicle is visiting 26 places throughout Scotland and the exhibition will be open to invited shopkeepers and trade representatives. The arrangements have been made to the requirements of a Glasgow firm exhibiting the goods. The coach is worked in point to point in timetable trains. Another firm is reported to have approached the Scottish Region with a view to fitting out a vehicle for a tour in May.

Road Accident Statistics.—Accidents on the roads of Great Britain in December, 1957, caused 659 deaths and 6,161 cases of serious injury; the total for all casualties was 25,515. Compared with December, 1956, when petrol rationing was in force, these figures represent an increase of 22 per cent. The total number of persons killed on the roads during 1957 was 5,550, 183 more than in 1956. The total of 273,858 for all casualties is 5,898 more than in 1956, an increase of 2 per cent. Traffic on main roads during 1957 was about the same as in 1956, as the decline caused by fuel restrictions was offset by the subsequent increase.

Electrification of Southern Region West of England Main Line.—Electrification is stated to be planned of the Southern Region main line from Waterloo to Exeter, at present electrified as far as Pirbright Junction; the date envisaged for completion is 1973. It is hoped to have diesel-electric traction on Southern Region lines in the West of England by 1962.

# RAILWAY NEWS SECTION

## PERSONAL

Mr. A. G. Hall, Commissioner, Western Australian Government Railways, resigned on December 20 for reasons of ill-health. Mr. T. W. Brodie, Chief Traffic Manager, has been appointed Acting Commissioner.

Mr. C. C. H. Wade, retiring Chairman of the Locomotive & Allied Manufacturers' Association of Great Britain, is Manager, Traction Sales & Contracts of the English Electric Co. Ltd. He joined that company in 1922 as a student-apprentice at Preston. Previously, he had obtained a diploma in electrical engineering and applied physics at the City & Guilds (Finsbury) Engineering College. In 1924 he became Assistant Resident Engineer for the English Electric Co. Ltd. on the construction of rotary-converter substations for the Southern Railway. From 1925 to 1935 he carried out various duties in the company's Traction Department and, from 1935 to 1938, was its Resident Engineer on the electrification of the railways in Poland. Mr. Wade subsequently received the following appointments with the English Electric Co. Ltd.: Chief Traction Projects Engineer (1938), Works Superintendent, Plant & Transformer Works, Stafford (1940); Works Manager, Plant & Transformer Works, Stafford (1943), and Deputy Manager, Traction Department (1945). He became Manager of Traction, Sales & Contracts, in 1948. In 1954 he was elected Chairman of the Internal Combustion Group of the Locomotive Manufacturers' Association and, in 1953, a Member of Council of the Institution of Locomotive Engineers.

Mr. N. E. Spencer, General Agent, Paris, Canadian Pacific Railway, has been appointed General Agent, Bristol, in succession to Mr. H. McBride, who has returned to the London City Office on promotion. Mr. R. A. Leleu succeeds Mr. Spencer as General Agent, Paris. He will have jurisdiction over France, Switzerland, Italy, Greece, Spain, and Portugal. Mr. W. F. L. Smith has been appointed Assistant General Agent, Paris.

Mr. Henry C. Friel, Q.C., has been appointed Vice-President & General Counsel of Canadian National Railways.

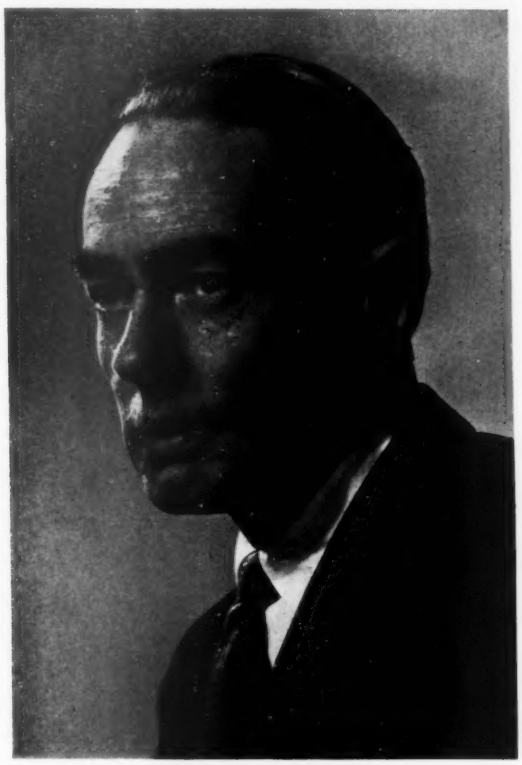
The newly-formed B.T.C. Police Committee, referred to editorially and elsewhere in this week's issue, is made up as follows: Lord Rusholme, Member of the B.T.C. (Chairman); Mr. D. H. Cameron of Lochiel, Member, B.T.C.; Mr. M. H. B. Gilmour, Chief Solicitor & Legal Adviser, B.T.C.; Mr. J. Haworth, Member of the London Midland Area Board of the B.T.C.; Sir Frank Newsma, former Permanent Under Secretary of State for the Home Department; Mr. K. W. C. Grand, General Manager, Western Region, British Railways; Mr. A. H. Grainger, Deputy Chairman, London Transport Executive; Sir H. Reginald Kerr, General Manager, B.T. Waterways.

Mr. J. H. Allen, Principal Executive Officer (Movement), Rhodesia Railways, has been appointed Deputy General Manager of that system.

Mr. Geoffrey Thorold Owen, Managing Director, North British Locomotive Co. Ltd., who has been appointed President of the Locomotive & Allied Manufacturers' Association of Great Britain for the coming year, was educated at Rossall School and Stafford Technical College. He was a student apprentice at the works of W. G. Bagnall Limited from 1922 until 1926. Between 1927 and 1937 he was employed by that company, carrying out various duties including tours in India and in Egypt. He joined Newall's Insulation Company in 1938 as Contracts Manager of the company's Midland activities. He returned to W. G. Bagnall Limited in 1939 as Personal Assistant to the Managing Director. In 1940 he joined the staff of Associated Industrial Consultants Limited as a resident engineer. In 1942 he was promoted to be Supervising Engineer for the company's business in the West of Scotland, which position he held until 1950 when he joined North British Locomotive Co. Ltd. as General Manager. He was elected to the board in 1952 and became Managing Director in September, 1957.

We regret to record the death, at the age of 60, of Mr. Robert B. Young, Chairman of the New York Central Railroad.

*Mr. C. C. H. Wade*
Chairman, Locomotive & Allied Manufacturers' Association, 1956-58



*Mr. G. T. Owen*
Elected Chairman of the Locomotive & Allied Manufacturers' Association

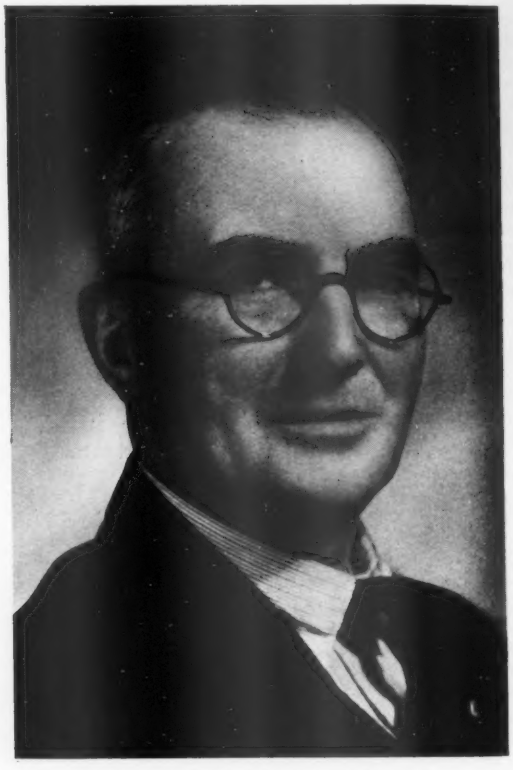
Mr. W. J. P. Webber has been appointed a part-time Member of the National Coal Board. Mr. Webber is the General Secretary of the Transport Salaried Staffs' Association.

Mr. C. E. Jefferson, Vice-President of Traffic for the Canadian Pacific Railway, who, as recorded in our January 3 issue, has retired, was born in Boston, Mass., and has over 50 years of railway service in the United States and Canada. He joined the C.P.R. at Montreal in 1913, becoming General Freight Agent there in 1921, and moving to Winnipeg the same year. In 1927 he became Assistant Freight Traffic Manager for Western Canada. He returned to Montreal in 1930 as Freight Traffic Manager for the system and, in 1948, became General Traffic Manager with jurisdiction over all C.P.R. traffic, rail, freight and steamship services. Mr. Jefferson was appointed Vice-President of Traffic of the Canadian Pacific Railway in 1950.

*Mr. C. E. Jefferson*
Vice-President (Traffic), C.P.R., who has retired

The late Mr. Thomas Hornbuckle, whos death on February 1 at the age of 77 was recorded in our las. week's issue, began his career with the former Midland Railway as a draughtsman in the Electric Construction Office at Derby. In 1911 he transferred to the Locomotive Works to supervise certain electric construction and general engineering work. He later took charge of the provision and installation of new plant and machine tools. During the 1914-18 war he was made an M.B.E. for work in connection with munitions. In 1925 he was appointed Assistant Works Manager, Derby, and, in 1928, Technical Assistant to the Carriage & Wagon Superintendent. In 1931 he became Chief Technical Assistant to the Chief Mechanical Engineer. Mr. Hornbuckle, who held the degree of B.Sc. (Eng.) (London), and was an associate member of the Institute of Civil Engineers, was a protagonist of diesel-mechanical shunting locomotives on the former L.M.S.R. In 1937-38 he was President of the Diesel Engineers & Users Association, before which body he read a paper entitled "Further Applications of Diesel Engines to Rail Transport" in March, 1948.

We regret to record the death on January 16, at the age of 66, of Mr. Percy Reginald Hickman, O.B.E., formerly Chief Officer (Stores), Railway Executive. Mr. Hickman, who retired on January 31, 1952, began his railway career in the Stores Department of the former Midland Railway at Derby in 1905. He was transferred to Euston in 1926 as Assistant (Stores Inspection) to the Chief Stores Superintendent of the L.M.S.R. and four years later became General Assistant. Between 1943 and 1945 he was Chief Superintendent of Sea Transport Stores, Ministry of War Transport, and in that capacity visited the U.S.A., Canada, India, Ceylon, South Africa, the Mediterranean area, and North West Europe. He resumed his duties with the former L.M.S.R. in January, 1946, as General Assistant, and, in May of that year, was appointed Assistant Chief Stores Superintendent. He became Regional Stores Superintendent in March, 1948, and Chief Officer (Stores), Railway Executive, in January, 1950. He was made an O.B.E. in the Birthday Honours in 1946.



*The late Mr. P. R. Hickman*
Chief Officer (Stores), Railway Executive, 1950-52

Dr. C. T. Newnham, Regional Medical Officer, Western Region, British Railways, and Mr. J. A. Martin, Regional Ambulance Secretary, have been promoted in the Order of St. John of Jerusalem to the Grade of Officer (Brother).

At a recent ceremony, Mr. A. S. Duffield, Regional Catering Superintendent, North Eastern Region, British Transport Hotels & Catering Services, was the recipient of a V.H.F. radio and a nest of tables. The presentation was made on behalf of the Refreshment Room & Restaurant Car Staff of the Region by Mr. E. K. Portman-Dixon, Chief of Restaurant Cars & Refreshment Rooms. Among speakers who expressed their good wishes on his retirement were Mr. B. G. Bradley, District Refreshment Room Manager, York, and Mr. H. Greenhome, Regional Restaurant Car & Station Refreshment Room Manager, Newcastle. Mr. Duffield, who retired on February 2 after 46 years of service with the B.T. Hotels & Catering Services and its predecessors, began his career in 1912 in the Chief Accountant's Department of the Great Northern Railway at Kings Cross. He transferred to the Hotels Section on his return from H.M. Forces in 1919 and, after occupying various positions at Liverpool Street, became Chief Clerk in the Hotel Accountant's Office, York, in 1937. In 1949, following the formation of the Hotels Executive, he was appointed District Refreshment Room Manager, York. In 1953 he became Administrative Assistant to the Refreshment Room Superintendent, and, in 1954, Regional Catering Superintendent.

*Mr. R. D. Gardiner*

Assistant Divisional Traffic Manager, Nottingham, L.M. Region

*Mr. A. J. Sweetman*

Appointed District Express Agent, London, Canadian National Railways

*Mr. H. E. Adshead*

Appointed District Express Agent, Liverpool, Canadian National Railways

Mr. R. D. Gardiner, Assistant Divisional Motive Power Superintendent, Derby, London Midland Region, British Railways, who, as recorded in our January 31 issue, has been appointed Assistant Divisional Traffic Manager, Nottingham area, joined the former L.N.E.R. at Stratford Works in 1928 as an apprentice. After experience in the Electrical Engineer's Department and at various motive power depots he took charge of the locomotive depot at Southend. He joined the Royal Engineers in 1940, and served for a period at the War Office and in India, Persia, Lebanon, Sicily, and Italy. He was demobilised in 1946 with the rank of Lieutenant-Colonel, and was twice mentioned in despatches and awarded the M.B.E. (Military). On returning to the railway, Mr. Gardiner served as Locomotive Shedmaster at Colchester and, later, Cambridge and was appointed Assistant District Motive Power Superintendent, Cambridge, in 1947. He became Acting District Motive Power Superintendent at Plaistow in 1949 and at Cambridge in 1953. His appointment as Productivity Assistant to the Motive Power Superintendent, Eastern Region, took place in 1954 and later in that year he became Assistant Motive Power Superintendent, Derby.

Mr. R. C. Bennett, M.Inst.T., has been appointed Assistant Divisional Traffic Manager, Liverpool Area, London Midland Region, British Railways. Mr. Bennett joined the former L.M.S.R. on the Tilbury Section in 1923. After service at a number of passenger and goods stations in the London, Tilbury & Southend and London areas he moved to the District Passenger Manager's office in London in 1932. The following year he transferred to the headquarters of the Chief Operating Manager. He subsequently served at Birmingham, Peterborough, Gloucester, and Liverpool, becoming Assistant District Operating Superintendent at Euston in 1952 and District Operating Superintendent, Liverpool Central, in 1953. Mr. Bennett was appointed Assistant (Modernisation) to the Operating Officer (located at Crewe) in 1952, the position he now vacates. In connection with this appointment we published a photograph of Mr. Bennett and his biography in our issue of August 30, 1957.

Mr. Alfred John Sweetman, who, as recorded in our January 17 issue, has been appointed District Express Agent, London, Canadian National Railways, was born in Battersea in 1904 and joined the London office of the company in May, 1923. He was appointed Express Traffic Representative, the position he now vacates, in October, 1947.

Captain F. Ardern has been appointed General Agent for British Railways in Ireland.

We regret to record the death on January 31, at the age of 75, of Mr. Alfred Ernest Hudd, late Consulting Engineer, British Railways.

Mr. L. Holmes has been appointed Assistant (Claims), Chief Traffic Manager's Office, Leeds, North Eastern Region, British Railways.

Mr. F. Everitt, Deputy District Engineer, West Riding, North Eastern Region, British Railways, has been appointed District Engineer, Darlington.

Mr. M. F. Barbey, Assistant (Bridges), Chief Civil Engineer's Office, York, North Eastern Region, British Railways, has been appointed District Engineer, Hull.

Mr. P. J. Sheldon, District Work Study Assistant, District Engineer's Office, Newport, Western Region, British Railways, has been elected an associate member of the Institution of Civil Engineers.

Mr. C. Pritchett, U.K. Manager of Exide & Drydex Replacement Sales for Chloride Batteries Limited, has retired after 25 years of service with that company.

Mr. Herbert E. Reynolds, Assistant Manager at Bristol for Ruston & Hornsby Limited, has been appointed to succeed Mr. C. W. Hudson at the Bristol office of the company. Mr. Hudson retired last year after more than 50 years of service.

Mr. W. Dalziel, Production Manager of the Electronic & Equipment Group of the Plessey Co. Ltd., and Mr. H. Fox Wright, Contracts Manager of the company, have been appointed Executive Directors.

Mr. H. E. Adshead, who, as recorded in our January 17 issue, has been appointed District Express Agent, Liverpool, Canadian National Railways, was born in November, 1902. He joined the C.N.R. in August, 1916, and, after holding various clerical positions in the Traffic Department, was appointed Express Traffic Representative, the position he now leaves, in October, 1947.

Mr. F. J. Clark has relinquished his appointments with the British Oxygen Group.

Mr. G. McCutcheon has been appointed Works Superintendent at the Gateshead factory of Quasi-Arc Limited.

Mr. Nat Fletcher, Publicity Manager of the Taylor Woodrow Group, has been appointed a director of Taylor Woodrow Services Limited.

Mr. Frank Smith has been appointed Director & General Manager of Semtex Limited, a Dunlop subsidiary.

Mr. L. H. Cooper, Chairman of the Mond Nickel Co. Ltd. and Vice-President of the International Nickel Co. of Canada Ltd., has been elected a director of the latter company.

Mr. Robert Williamson, Press Officer for the Dunlop Rubber Co. Ltd., is retiring while remaining available as a consultant. He will be succeeded by Mr. Campbell Fraser.

Mr. R. A. Dyson, Deputy Chairman of the British Wagon Co. Ltd., has been appointed Chairman of that company. He replaces Mr. W. H. Copley, who has retired from the chairmanship but who remains on the board.

Mr. W. E. Wright has retired from the board of the Pyrene Co. Ltd. and from control of the Metal Finishing Division of that company. Mr. H. F. Marshall, who has been a director since 1947, now takes over board responsibility for the Metal Finishing Division.

Mr. A. D. Smart relinquishes the position of Secretary to the British Oxygen Co. Ltd. on becoming Finance Manager of that company. Mr. B. R. D. Clark has been appointed Secretary in his place.

Mr. J. D. Dunham, Manager at Beirut for Thos. Cook & Son Ltd., has retired after 50 years of service with the company. He has been succeeded by Mr. R. Woodward, Manager at Baghdad, who is succeeded by Mr. D. A. Halmshaw.

Mr. Herbert E. Hill has been appointed a director of Associated Commercial Vehicles Limited and has resigned from Park Royal Vehicles Limited.

Mr. J. H. Mayes, General Sales Manager of the Northern Aluminium Co. Ltd., has been appointed to the board of that company.

Mr. R. L. Walker has been appointed General Manager of John Lynn & Co. Ltd. Mr. Walker underwent a pupilage in the Chief Mechanical Engineer's Department of the Southern Railway until the outbreak of war in 1939, when he joined H.M. Forces. He attained the rank of major in the Royal Engineers and, on demobilisation, joined the Sudan Railways. He held various senior positions in the mechanical department of that system until Sudanese independence was achieved in 1955. Since 1956 he has been Development Engineer with Sir James Laing & Sons Limited.

Following the acquisition of the Fletcher Miller Group by C. C. Wakefield & Co. Ltd., the following board appointments have been announced: Mr. S. R. Miller, Chairman of Fletcher Miller Limited, to the board of C. C. Wakefield & Co. Ltd.; Mr. A. George, Director & Secretary, Fletcher Miller Limited, and Mr. R. T. Miller, Director, Fletcher Miller Limited, to the board of Wakefield-Dick Industrial Oils Ltd.; Mr. J. C. Cragg, Manager, Stanlow Works, C. C. Wakefield & Co. Ltd., Mr. J. W. MacMahon, General Manager, Industrial Lubricants Division, Wakefield-Dick Industrial Oils Ltd., and Mr. L. J. Windridge, Secretary, Wakefield-Dick Industrial Oils Ltd., to the board of Fletcher Miller Limited.

Mr. S. Teasdale has been appointed a North-West technical representative for Martonair Limited. He will cover South Manchester, Chester, Crewe, and Oldham. Mr. R. G. Barnes will continue to represent the company in the Sheffield area.

Mr. B. H. Mears, Sales Director of Mirrlees, Bickerton & Day Limited, has left this country on an eight-week sales tour of the Far East. He will visit Iraq, Thailand, Malaya, Singapore, Australia, and New Zealand, spending approximately 10 days in each country. He will return via the Pacific, Canada, and America.

Mr. Eric Goodhew, Chief Electrical Engineer in charge of Laboratories at the Croydon Works of Philips Electrical Limited recently received presentations on the completion of 25 years of service with the Philips organisation. Mr. Goodhew, who is a chartered electrical engineer and a member of the Institution of Electrical Engineers, has been a delegate for the U.K. to the International Electro-Technical Commission since 1952.

Mr. P. H. Muirhead has resigned his appointment as Managing Director of Vickers-Armstrongs (Engineers) Limited and his Directorship of that company. He will retain his other Group directorships for the time being, but remains on sick leave. Mr. W. D. Opher succeeds him as Managing Director with effect from February 1, 1958. Mr. Opher and Mr. R. P. H. Yapp have been appointed Special Directors of Vickers Limited.

Mr. J. W. MacMahon has been appointed General Manager of the Industrial Lubricants Division of Wakefield-Dick Industrial Oils Limited, succeeding Mr. R. J. Turner, who has retired. Mr. MacMahon also has been appointed to the board of the company. Mr. C. R. Woodfield, Works Production Manager of the Wakefield Group, also has joined the Wakefield-Dick board. The company also announces that Mr. C. W. Page, Mr. D. S. Kirkpatrick, Mr. F. Rogerson, and Mr. H. W. Towle have been appointed Regional Sales Managers and that Mr. M. Nicol has been appointed Regional Sales Promotion Manager.

*Mr. W. D. Kirby, Assistant (Operating Statistics) British Railways Central Staff, B.T.C., who has retired, receiving a presentation from Mr. R. F. Harvey (right), Chief Operating & Motive Power Officer, British Railways Central Staff*

Mr. A. C. Yeates has been appointed Chairman of Crossley Premier Engines Limited, succeeding the late Sir Kenneth I. Crossley, Bt.

The Lancashire Dynamo Group announces that Mr. A. J. Beanland has been appointed Group Sales Director. Mr. Beanland, who will be a Director of Lancashire Dynamo Group Sales Limited, will be in charge of the group's sales organisation at home and overseas.

Mr. J. W. Whimpenny, Joint Managing Director of W. H. Dorman & Co. Ltd., and Mr. Ian MacLeod-Smith, General Sale Manager of that company, left the United Kingdom by air on February 1 to visit Dorman's interests in Canada. Mr. MacLeod-Smith will subsequently fly from Canada to tour Central and South America and the Caribbean area. The tour will last two to three months.

We regret to record the death on February 4 of Mr. H. Hanson, Deputy Chairman of Turner & Newall Limited until his recent resignation because of ill-health. Mr. Hanson had served the company for more than 50 years. He took an especial interest in the foundation and growth of the asbestos-cement side of the organisation and was for many years Chairman of Turners Asbestos-Cement Co. Ltd. He also held other directorships within the group. He became Deputy Chairman of the parent company in December, 1954.

The following appointments to the board of Reynolds T.I. Aluminium Limited have been announced: Sir Ivan A. R. Stedford (Chairman); Mr. R. S. Reynolds, Jnr. (Alternate Chairman); Lord Reith, Mr. W. G. Reynolds, Mr. J. L. Reynolds, Mr. J. H. McConnell, Mr. A. J. S. Aston, and Mr. R. D. Young. Mr. Paul R. McGehee has been appointed Chief Executive (Manufacturing & Technical), and Mr. Basil James, Chief Executive (Sales). (Reynolds T.I. Aluminium Limited was formed last November to combine the U.K. interests and activities of Tube Investments Limited and the U.S.A. Reynold Metals Group.)

Mr. David H. Bramley, head of the Department of Industrial Administration at the College of Technology, Birmingham, has joined the board of Geo. Salter & Co. Ltd. He will continue to hold his College position. Mr. Bramley is a founder-member of the British Institute of Management and was a member of the special committee set up by the Minister of Labour in 1954 to make recommendations on supervisory management training in British industry. In 1951 he was a member of the Anglo-American Council on Productivity team which investigated the training of supervisors in the United States.

Mr. Kenneth Robinson, Chief Assistant Editor of the *Architect's Journal*, has been appointed Promotion Officer to the Council of Industrial Design in succession to Mr. Morris J. Brown, who left the Council at the end of December last. He will deal with home and overseas promotion and advertising. Miss Joyce Blow will continue to handle Press relations. Owing to the prolonged illness of Mr. Tom Gregson, Industrial Division, Mr. Colin MacGregor has been appointed an Industrial Officer to handle Mr. Gregson's industries for the present and to assume responsibility for transport. Mr. MacGregor has worked on the design staff of Briggs Motor Bodies, the Ford Motor Company and the Rover Company.

# NEW EQUIPMENT AND PROCESSES

## Lightweight Pneumatic Tools

A RANGE of lightweight pneumatic tools is to be produced in this country under licence from the Aro Corporation, U.S.A. The general trade name of this range will be Aro-Broomwade.

Two items of the range are a $\frac{3}{16}$ - $\frac{1}{4}$ in. drill and a combined screwdriver and nut-runner.

The drill is available in two versions, both of which are illustrated (above, and upper illustration below); these have a pistol grip or a side lever control. The weight of the two models is less than $1\frac{1}{2}$ and $1\frac{1}{4}$ lb. respectively. The standard drilling capacity is $\frac{3}{16}$ in., but a $\frac{1}{4}$-in. chuck can be supplied.

The drills, for which good power: weight and power: air ratios are claimed, have tough aluminium housings. The throttle is stated to give positive speed control with easy operation.

The design includes a locked-in motor which is located with a keyway and pin to provide easy dismantling. All moving parts have ball bearings. The planet gears are mounted on self-contained Torrington needle bearings with no bushings; motor parts are interchangeable. The front and rear spindle mountings are stated to hold run-out, side play and end play to a minimum. The pistol grip model also features a built-in oiling point.

Each model has alternative variants with speeds of 1,800 or 3,000 r.p.m. The pistol grip drill has the following leading particulars: length, $5\frac{1}{2}$ in.; height, $4\frac{7}{8}$ in.; spindle offset, $\frac{11}{64}$ in. Particulars of the lever-type drill are: length, 6 in.; spindle offset, $\frac{11}{64}$ in. All the drills have $\frac{1}{4}$ in. B.S.P. air connections.

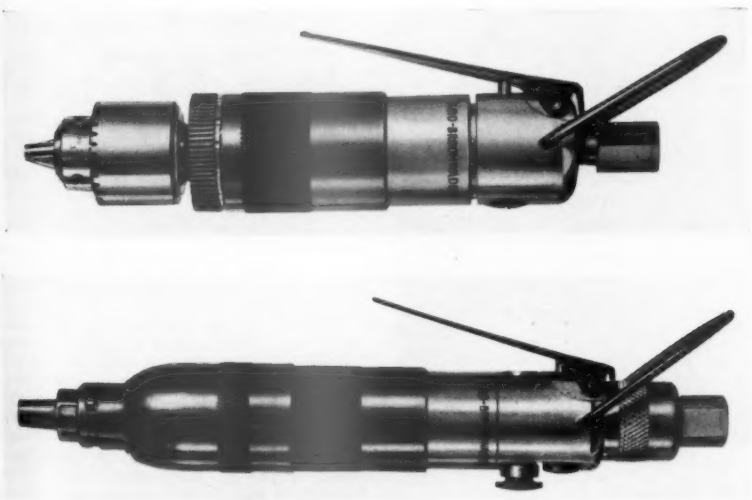
The Aro-Broomwade screwdriver and nut-runner is reversible, lever-operated, and is fitted with an adjustable clutch. Similar claims for favourable power, weight and air consumption comparisons, are made for this as for the drills.

Advantages claimed for the tools are the design, which is stated to embody features which give reliable performance at low cost, and its ability to be converted simply from a nut-runner to a screwdriver, and vice versa.

Designed for continuous high-speed production work, it has a push-button which gives instant reversal of drive. The adjustable clutch can be preset to the correct torque requirements. The clutch jaws automatically disengage when the screw or nut is driven to the appropriate tension.

Particulars of the tool, model No. 7500B, are: length, $7\frac{11}{16}$ in.; capacity No., 8; spindle offset, $\frac{21}{32}$ in.; air connection, $\frac{1}{4}$ in. B.S.P.; approximate weight, $1\frac{1}{2}$ lb.

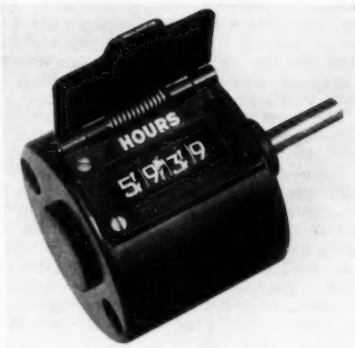
Full details of the foregoing Aro-Broomwade tools may be obtained from the manufacturer in this country, Broom & Wade Limited, High Wycombe, Bucks.



## Service Hours Recorder

A COMPACT, mechanical service hours recorder has been introduced; it has applications, for example, to diesel locomotive power units. The overall length of the unit is 1·825 in., which compares with $2\frac{1}{4}$ in. for the current design of unit, which will continue to be produced. This size allows it to be installed in small spaces.

A protective window cover is standard to the recorder, which has two mounting




holes at $1\frac{18}{32}$ in. centres. An extra, available at slightly higher cost, is a driveshaft extension. This has a threaded boss to provide a take-off point for a flexible drive, for example for installations requiring a tachometer.

Gearing is provided to order, and can be arranged to record one unit for almost any number of revolutions of the driveshaft up to 162,000. Service hours at mean driveshaft speeds up to a maximum of 2,700 r.p.m. can thus be recorded.

Before its introduction, the unit was given extended running tests, at speeds up to 5,000 r.p.m., under all the conditions in which it is likely to be used.

The recorder is manufactured by English Numbering Machines Limited, 25, Queensway, Enfield, Middx.

## Waterproofing Emulsion

A WATERBOUND bitumen waterproofing emulsion, which contains rubber, is now available. It can be used for waterproofing all types of roofs, as a protective coating for metal roofs and gutters, for weather-proofing walls, and so on.

Because of the presence of rubber in the compound, it is claimed to have a greater elasticity than ordinary bitumen emulsions. It can be applied by brush or squeegee, and does not bleed or crack with age.

It is supplied ready for use, but it may be diluted with water when used as a priming coat. For spraying, it can be thinned with up to $\frac{1}{2}$ pt. of water per gal. of emulsion. One gal. covers approximately 10 sq. yd.; two coats are required for the best results.

The emulsion is made by Expandite, Limited, Chase Road, London, N.W.10.

## Tungsten Electrodes

TO improve the quality of welds made by the manufacturer's Argonarc process, two types of tungsten electrodes have been introduced. Small percentages of thorium or zirconium have been added to improve emissivity. Improved arc-striking qualities, stability at low welding currents and almost total absence of arc wander are claimed.

Further details can be obtained from the manufacturer, British Oxygen Gases Limited, Spencer House, St. James's, London, S.W.1.

## New C.N.R. Marshalling Yard in Newfoundland

Mr. D. V. Gonder, Vice-President & General Manager, Atlantic Region, Canadian National Railways, recently announced that a new marshalling yard was to be built at Corner Brook, Newfoundland, on land reclaimed from the sea, at a cost of some $1,500,000. The lines in Newfoundland are 3-ft. 6-in. gauge.

The yard will have a total capacity of 470 wagons, and will be built on what is now the water of Humber Arm. To accomplish this, a mountain of rock fill material—more than 500,000 tons—will be blasted and dumped into the harbour to extend the present waterfront by 200 ft. along a distance of nearly a mile. The new yard will extend eastward from a point near the Western Terminals property, and the completed installation will include the present C.N.R. property in Corner Brook.

There will be 11 new tracks laid, with a capacity of 307 wagons; a passing track to accommodate 65 wagons; a shunting lead for 22 wagons; and a three-wagon express track. Capacity of the existing road-served sidings will be increased by 32 wagons.

### Servicing Facilities

The yard will have many new facilities for the servicing of trains and equipment. These include a turntable, oil bunkers, sand tower, a diesel shop and wagon repair building, a sandhouse and storage building, wheel storage facilities and a track scale installation for weighing wagons.

Paved roadways will be constructed to provide easy access to the area, and a car park is to be provided. The present roadway fronting the station and freight sheds will be paved along its entire length.

The present freight sheds are to be enlarged to increase their capacity by 60 per cent, with resultant efficiency in reception, sorting, and despatch of goods. A new express building will be constructed to the west of the present station, and adjacent to the goods sheds. A special siding for express freight is to be built, so that wagons can be quickly separated from arriving trains and shunted directly to the receiving doors, avoiding the necessity of sorting goods in the wagons. The express building will be equipped with the most up-to-date facilities for rapid handling of shipments.

With the removal of the express section from the station building, the station will be renovated and will be practically doubled in size as regards space available for C.N.R. offices and public waiting rooms.

To obtain the most efficient operation tion of the new yard, the main line leading towards Humbermouth will have to be lowered, in some places as much as 14 ft. This will provide an approach and departure track with a more favourable grade than presently exists.

## Rapid Erection of Cable Bridges on District Line

Five cable bridges at sites spaced over four miles of track were erected in 6¼ hr. on the District Line of London Transport during a recent week-end. The actual work of erection was carried out by four steel erectors and the London Transport crane driver.

Preliminary work is being carried out by L.T.E. on the Upminster line in preparation for the eventual taking over of responsibility for two of the four tracks which L.T.E. trains now share with the Eastern Region of British Railways between Campbell Road Junction and Upminster, and a new train depot is being built at Upminster; the cable bridges are needed in connection with the work.

### Special Train

The engineer's train, including one of the six-ton diesel-electric travelling jib cranes built to pass through tube tunnels at service speeds, arrived at Dagenham and started work on the first cable bridge at 2.5 a.m. It was then re-formed and ran to Upminster Bridge, where the second cable bridge was being erected.

The last three cable bridges were all in the Upminster depot area. Once the train had arrived at the depot there was no need for it to be re-formed, as the crane is self-propelling. The last bridge was in place at 8.45 a.m.

One of the bridges is of lattice-girder type spanning 43 ft. The others are of the hoop type, made from joists or channels, with spans varying from 17 to 29 ft.

The contractors for the steelwork and erection were the Fairfield Shipbuilding & Engineering Co. Ltd., of Chepstow, Wales. The work was under the general direction of Mr. C. E. Dunton, Chief Civil Engineer, London Transport.

*Hoop-type cable bridge in course of erection. The Upminster depot, now under construction, can be seen in the background*

## Crompton Parkinson Limited in 1957

The demand for many of the products of Crompton Parkinson Limited reached a new high level in 1957. The development of production facilities was helped by a substantial capital expenditure over the past two years; much of this was directed towards the modernisation and extension of the various factories and their plant.

The Traction Division received further orders during the year for equipment required by British Railways under their modernisation plan. Apart from various auxiliary equipment, the company will now supply the complete electrical equipment for 83 locomotives of 1,160-1,550 h.p. to be built by the Birmingham Railway Carriage & Wagon Co. Ltd., and for 10 locomotives of 2,300 h.p., which are being built by British Railways at Derby. The 1,160-h.p. locomotives are destined for the Eastern and Scottish Regions. The 1,550-h.p. locomotives, of which 45 are to be built, are for the Southern Region.

The 2,300-h.p. locomotives are being built for service in the London Midland Region. Testing of the generators began recently.

These machines have a continuous output of 1,531 kW., which is greater than that of any traction generator previously constructed in Europe. They will be coupled to 12-cylinder double crankshaft engines, supplied by Sulzer Bros. (London) Limited, the contractors for the engine and transmission equipment.

The company delivered to the Birmingham Railway Carriage & Wagon Co. Ltd. the remainder of the electrical equipment for a contract of 13 locomotives ordered by the Crown Agents for mixed traffic duties on the Ghana Railways, most of which commenced service during the year.

### Traction Motors

During the year 24 cylindrical frame 70-h.p. traction motors were supplied to the Gloucester Railway Carriage & Wagon Co. Ltd., for equipping six dynamically braked cars for the Toronto Rapid Transit Subway, and a 1,500-V. motor coach set of traction equipment on the Liverpool Street-Shenfield stock of Eastern Region, British Railways was commissioned. The control equipment incorporates contactors manufactured under licence from the Oerlikon Manufacturing Company, Switzerland.

A trolley locomotive of a new type for industrial use was built in Johannesburg by Hunslet Africa (Pty.), with an interesting form of transmission. Two 62-h.p. continuously running, compound wound traction motors of the cylindrical frame type drive one into each side of a mechanical differential; the locomotive drive is taken from the differential cage. Two locomotive equipments were supplied.

## Changes in Organisation of British Transport Police

In December, 1956, the British Transport Commission invited Sir Alexander Maxwell, former Permanent Under Secretary of State for the Home Department, to examine and to report on the functions and organisation of the B.T.C. Police Force. By arrangement with the Permanent Under Secretary of State for the Home Department, Sir Alexander Maxwell was assisted by Sir William Johnson, one of H.M. Inspectors of Constabulary.

The Commission has decided to implement certain changes which were recommended in Sir Alexander Maxwell's report in regard to the administration and organisation of its police force. For this purpose the Commission has appointed a Police Committee; the names of the members are given in our personal pages.

The main recommendation in the report, it is announced by the Commission, is that the British Transport Police Force be maintained as a unified force with a single head and a clear chain of command. The Commission has accepted this recommendation, also a further recommendation that the post of Chief Police Officer as it now exists be abolished and that there should be an executive head of the force carrying the title of Chief Constable, with full responsibility to the Police Committee for the efficiency and wellbeing of the Force. This post will shortly be publicly advertised.

Colonel N. McK. Jesper, the present Chief Police Officer, will be retiring from the service of the Commission shortly after the appointment of the Chief Constable, but his services will be retained in a consultative capacity for a further period.

## British Railways Timetable Alterations

Among recent timetable changes to trains using the East Coast Route, the "Fair Maid" (7.50 a.m. from Kings Cross to Perth and 6.40 a.m. return) is now stopping at Kinross Junction in each direction without increase of journey time. By diesel connection from Edinburgh the down "Fair Maid" makes it possible to reach Glasgow (Queen Street) as early as 4.1 p.m., over 1½ hours in advance of the first arrival by day train from Euston. For any who are not able to get away from Glasgow in time for the 1.30 p.m. "Midday Scot" to Euston, also, the diesel departure at 2.30 p.m. from Queen Street permits an arrival in Kings Cross at 10.43 p.m. by the up "Talisman."

In Scotland the 8.30 p.m. from Perth to Blair Atholl now starts at 8.40 p.m., and so makes connection with the 6.55 p.m. from Edinburgh Waverley to Perth also with the Perth portion of the 10 a.m. "Royal Scot" from Euston.

Restaurant cars are now provided on the 6.35 p.m. from Kings Cross to Hull and the 5.15 p.m. from Hull to Kings Cross.

Among recent additions to the Southern Region timetables is a new 5.54 p.m. from Victoria to Brighton and Eastbourne. The Brighton portion calls only at Haywards Heath and reaches Brighton at 6.58 p.m., acting as a relief to the 6 p.m. down; the Eastbourne portion calls also at Lewes, Polegate and Hampden Park, and reaches Eastbourne at 7.22 p.m., breaking the interval between the 5.20 and 6.45 p.m. from Victoria. In the Western Section there is a new 5.35 p.m. from Waterloo to Guildford (first stop), Farncombe, Haslemere and all stations to Portsmouth Harbour, reached at 7.22 p.m., and a new 9.20 p.m. from Portsmouth Harbour to Portsmouth, Haslemere, Guildford Woking and Waterloo only, due at 10.59 p.m. A buffet car is now provided on the 6.30 a.m. from Exeter Central to Waterloo (the new early morning express introduced in September last), and restaurant cars are restored on the 5 p.m. from Waterloo to Yeovil Junction; the 3 p.m. from Waterloo to Exeter now has a buffet car instead of restaurant cars, and refreshment facilities have been withdrawn from the 3.30 p.m. from Waterloo to Bournemouth West.

## Parliamentary Notes

### Railway Accidents

In reply to Mr. P. Goodhart (Beckenham—C.) who on February 6 asked for some statistics of railway accidents in Britain since 1952, Mr. G. R. H. Nugent, Joint Parliamentary Secretary, Ministry of Transport, stated in a written answer that this information was set out in some tables which he provided. A great many of the accidents caused only minor injuries. An analysis of the causes of all train accidents, he pointed out, was in Appendix I.V. of the Annual Report of the Chief Inspecting Officer of Railways, copies of which were available in the Library.

### Nationalised Industries' Board Members

Mr. Airey Neave, Joint Parliamentary Secretary to the Ministry of Transport, stated in answer to a question in the House of Commons on February 5 that the Minister of Transport would not introduce legislation requiring members of the boards of nationalised industries to give up other appointments and directorships. He referred to the reply by Mr. R. A. Butler on December 17, in which it was stated that full-time members of nationalised boards were normally required to give up other appointments, but in exceptional cases could, with the approval of the Minister concerned, hold outside directorships. Part-time members might hold outside directorships which in the opinion of the Minister would not be likely to prejudice their functions as members of the board.

### Falls of Road Vehicles on to Track

Mr. Harold Watkinson, Minister of Transport & Civil Aviation, in reply to a question on January 29, stated that after investigations at the site of an accident at Kilsby, Northamptonshire, where a lorry had fallen down on to the railway line, arrangements had been made to provide special "black spot" warning signs. It had also been decided to erect substantial guard fenders on the bridge approaches to prevent vehicles out of control from falling into the railway cutting. Three incidents at other sites were being investigated to determine whether additional protective measures were necessary

### Health, Safety and Welfare on Railways

The following motion, signed by some Labour Members, was tabled in the House of Commons on January 23:

"*Health, Safety and Welfare Conditions on Railways:* That this House regrets that, despite the assurance given by the then Prime Minister on June 9, 1955, in regard to legislation for dealing with the recommendations of the Gowers Committee for dealing with health, safety and welfare provisions on railways, the Government have not yet seen fit to give any firm indication of their intention to implement this firm promise, and therefore calls upon H.M. Government to implement immediately the assurance given by Sir Anthony Eden in June, 1955."

The Leader of the House, Mr. R. A. Butler, stated on January 30 that he hoped that in due course the motion could be debated.

## Questions in Parliament

### Area Board Salaries

Mr. Ernest Davies (Enfield E.—Lab.) asked the Minister of Transport & Civil Aviation on January 29 whether, under the powers conferred upon him by Section 94 of the Transport Act, 1947, he would require the B.T.C. to include in its annual accounts the emoluments of the Chairman, Vice-Chairman, and Members, respectively, of the Area Boards.

Mr. Harold Watkinson: No. Under the Railway Re-organisation Scheme authorised by Parliament in 1954, the Commission was made wholly responsible for appointing members of the Area Boards and for determining their remuneration. These boards are thus in a quite different category from Area Public Boards whose members are appointed by the responsible Minister and whose salaries and allowances are published periodically by the Government. The Commission is in line with public companies by publishing in its annual accounts the total amount paid in fees to members of Area Boards, which in 1956 was just under £20,000. This figure relates to 40 Members of Area Boards who had served the Commission in a part-time capacity for all or part of the year.

Mr. Davies: Why are the Minister and the Commission so secretive about this? It is most unfortunate that at this time when there is an attempted restriction of increases in the wages of railwaymen, that members of these boards should have their fees doubled, as is believed by the men in the industry to be the case. Can the Minister state whether these fees have been doubled within the last few months?

Mr. Watkinson: The figures I have quoted show clearly that the average remuneration is £500 a year, which, on a part-time basis, is the lowest of any of the nationalised industries.

Mr. Davies: These figures relate to the year 1956, and the accounts for 1957 have not yet been published. There has been a change since 1956.

Mr. Watkinson: If the hon. Member will put down a Question about that I will answer it.

### Train Working in Fog

Mr. Ernest Davies (Enfield E.—Lab.) asked the Minister of Transport & Civil Aviation on February 5 whether he would appoint a committee to inquire into train operation during periods of fog and to report as a matter of urgency with recommendations to ensure the safety of the passengers and railwaymen.

Mr. G. R. H. Nugent, Joint Parliamentary Secretary, Ministry of Transport & Civil Aviation: I think we should await the reports of the inspecting officers on railways on the accidents at Lewisham and Dagenham.

Mr. Davies: The appointment of such a committee would be no reflection at all upon the operating staff. In view of the large number of accidents which have

occurred during foggy weather, in particular the last two tragic ones in close succession, such an appointment would assist in reassuring the public that everything possible is being done to preserve their safety during dense fog.

Mr. Nugent: I accept, of course, the statement that in foggy weather there is always extra strain and responsibility on all forms of transport, rail included. The Chairman of the B.T.C. has already written to General Managers and Chairmen of area boards asking for special vigilance in the light of those two unfortunate happenings. In the circumstances, we had better wait to see just what the causes were before we consider whether or not it is desirable to have any further inquiry.

Mr. J. Harrison (Nottingham N.—Lab.): Every foggy evening, millions of people are conveyed from London alone. The two recent accidents, though very serious in themselves, represent a very small number, in proportion to the milions of people conveyed and the millions of foggy nights we are accustomed to have in this country.

Mr. Nugent: The hon. Member is quite right. Hon. Members have been asking me about road accidents. If the rail record is set against the road record, it does not look too bad.

**Nationalisation Finance**

Colonel Lancaster (South Fylde—C.) asked the Chancellor of the Exchequer on February 5 what provision he proposed to make for meeting the capital requirements of the nationalised industries after March 31, 1958, when the powers to make Exchequer advances expired.

Mr. R. Maudling, the Paymaster-General, in a written reply: The Government propose shortly to introduce a Bill allowing the present powers to be exercised until the end of August, but only within the limit of money already authorised. This will give time to consider the future of this method of financing these industries in the context of the Government's general policies, and to include any necessary provisions in the Finance Bill.

**Railways for Swaziland**

Mr. Fenner Brockway (Eton & Slough—Lab.) asked the Under-Secretary of State for Commonwealth Relations on February 6 what conclusions had been reached of the recommendations of the Griffin Report on transport development in Swaziland.

Mr. C. J. M. Alport: The main recommendations concerning roads made in the Griffin Report of 1956 have been accepted by the Swaziland Government. A road programme, estimated to cost over £1 million over three years has been put in hand. The recommendations on railway development are being carefully examined by the Swaziland Government, but no conclusion has been reached.

Mr. Brockway: May I ask what the recommendations are about railways in view of the fact that there is no railway line in the Protectorate at the present time?

Mr. Alport: The Griffin Report, although still a confidential document, is available in the Library.

Mr. Paul Williams (Sunderland S.—C.) asked when a conclusion would be reached about railways, because the matter had been talked over for a considerable number of years.

Mr. Alport: I cannot at the present moment. The importance of this form of development to the future of Swaziland is very great, and therefore, it is most important that the Swaziland Government should have full time to consider the problems raised in the Griffin Report.

# Contracts and Tenders

*A.T.C. equipment for British Railways*

The British Transport Commission has placed contracts for initial supplies of British Railways standard A.T.C. apparatus. Most of the equipment ordered, which comprises 2,000 sets of track apparatus and sufficient equipment and spares for fitting 2,000 steam locomotives, is expected to be delivered this year. The contracts have been placed as follows:—

*Track Apparatus*

Darwins Limited, Sheffield; Wm. Jessop & Sons Limited, Sheffield; Jas. Neill & Co. (Sheffield) Ltd.; Swift Levick & Sons Limited, Sheffield; Turton Bros. & Matthews Limited, Sheffield: 2,500 permanent magnet track inductors

Westinghouse Brake & Signal Co. Ltd., London, N.1: 2,500 electro-magnet track inductors

G. D. Peters & Co. Ltd., Slough: 2,500 track inductor ramps

Darwins Limited, Sheffield; Wm. Jessop & Sons Limited, Sheffield; Jas. Neill & Co. (Sheffield) Ltd.; Swift Levick & Sons Limited, Sheffield; Turton Bros. & Matthews Ltd., Sheffield: 500 shed test inductors.

*Locomotive Apparatus*

Darwins Limited, Sheffield; Wm. Jessop & Sons Limited, Sheffield; Jas. Neill & Co. (Sheffield) Ltd.; Swift Levick & Sons Limited, Sheffield: 2,100 receiver magnets

Tecalemit Limited, Plymouth: 2,000 receivers

G. D. Peters & Co. Ltd., Slough: 2,500 receiver cables and sockets

W. R. Sykes Interlocking Signal Co. Ltd., London, S.W.4: 2,000 driver's control units

Wm. McGeoch & Co. Ltd., Birmingham: 2,000 bell plugs and sockets

Dekko Cameras Limited, Acton: 2,000 vacuum horns

G. D. Peters Limited, Slough: 2,000 brake valves, 2,000 isolating cocks, 2,000 fuse boxes, and 2,000 receiver junction boxes

Geo. Spencer, Moulton & Co. Ltd.; 2,500 rubber pads and bushes

Telephone Manufacturing Co. Ltd., S.E.21: 2,000 relay units and junction boxes (and spare relays)

Gent & Co. Ltd., London, S.W.1: 2,000 bells

Nife Batteries Limited, London, S.W.1: 5,400 electric batteries

Rendar Instruments Limited, London, N.17: 2,000 carriers for receiver armature magnet, and 2,000 moulded sealing glands for receiver

British Insulated Callender's Cables Limited, Leigh, Lancs; Pirelli General Cable Works Limited, London, W.C.2; W. T. Henley's Telegraph Works Limited, London, E.C.1; Siemens Edison Swan Limited, London, W.C.2; Standard Telephones & Cables Limited, Newport, Mon.: five-core engine cable

W. T. Glover & Co. Ltd., Manchester 17; Johnson & Phillips Limited, London, S.E.7; Enfield Cables Limited, London, W.C.1; Metropolitan Electrical Cable & Construction Co. Ltd., Chadwell Heath, Essex; St. Helens Cable & Rubber Co. Ltd., Slough: two-core battery and bell cable

Uni-Tubes Limited, London, W.1: "Kopex" conduit.

The London Transport Executive has placed a contract for electrical installation work at Upminster Railway Depot with Troughton & Young Limited, London, S.W.3. The value of the contract is some £20,000 and the work is expected to be completed within a year.

The Canadian National Railways have placed orders for 151 diesel-electric locomotives at a cost of $27,500,000. General Motors Diesel Limited, of London, Ontario, will supply 81 main-line shunting locomotives; 55 of 1,200 h.p. and 26 of 1,750 h.p. Montreal Locomotive Works Limited will build seven two-unit main-line passenger locomotives, 45 main-line shunting locomotives of 1,800 h.p., and 11 yard shunting locomotives of 1,000 h.p.

British Transport Waterways have placed the following contracts:—

Crone & Taylor (Engineering) Limited, St. Helens, Lancs: two "Big Walrus" loaders for use as mobile loaders for the handling of bulk materials on North Eastern waterways

P. Kierman, Leeds: construction of a new lock house at Conisbrough Lock on the Sheffield and South Yorkshire Navigation

E. Somerfield & Son Limited, Nottingham: structural alterations to No. 2 warehouse and No. 2 transit shed at Trent Lane, Nottingham, to provide improved storage space

United Kingdom Construction & Engineering Co. Ltd., Kirkby, Liverpool: raising of bridge approaches and overhaul of Plank Lane Bridge on the Leigh Branch of the Leeds & Liverpool Canal.

British Transport Waterways are also to undertake, by direct labour, bank protection work near Vale Royal Lock, on the Weaver Navigation, as part of the £260,000 improvement scheme for that waterway. A deep water berth is to be constructed to provide improved accommodation for craft waiting to discharge coal at Whitebirk Power Station, Blackburn, on the Leeds & Liverpool Canal.

British Railways, North Eastern Region, have placed the following contracts:—

Broom & Wade Limited, High Wycombe: two air compressors, York North Motive Power Depot

Blackwood Hodge & Co. Ltd., London: Gradall multi-purpose excavator with attachments

J. W. Roberts Limited, Leeds: supply and spraying Limpet asbestos for 44 first class sleeping cars

E. Boydell & Co. Ltd., Manchester: four 3-cu. yd. diesel dumpers

Ridghouse Limited, Aycliffe: fabrication and erection of steel sand gantries, Thornaby Motive Power Depot.

Westwaggon has received an order from the Swedish State Railways for 65 sets (130 units) of Minden-Deutz two-axle bogies for passenger coaches. They are repeats of 100 sets already in service and 20 sets just being delivered.

The Iranian State Railways have ordered 50 diesel-electric 1,425 b.h.p. General Motors type G.12 locomotives, these being additional to the 70 of the same type acquired in 1956-57.

The Special Register Information Service, Export Services Branch, Board of Trade, has received calls for tenders as follow:—

*From Portuguese East Africa:*

4,200 rails of 12 m., or 2,100 rails of 24 m., 44·64 kg./m.
4,200 pairs of fishplates for 44·64 kg./m. rails
25,200 rail bolts with spring washers for 44·64 kg./m. rails
150,000 galvanised rail spikes
52 sets of points, complete, 1:9, left, for 30 kg./m. rails
11 sets of points, complete, 1:11, right, for 30 kg./m. rails
8 sets of points, complete, 1:11, left, for 30 kg./m. rails
6 sets of points, complete, 1:11, right, for 44·64 kg./m. rails
4 sets of points, complete, 1:11, left, for 44·64 kg./m. rails

The issuing authority is the Ports, Railways & Transport Department, Lourenço Marques. The tender No. is 25/58. A deposit must be made by tenderers for rails, Esc. 270,000; fishplates, Esc. 35,000; rail bolts, Esc. 5,000; rail spikes, Esc. 15,000; and points, Esc. 70,000. The closing date is April 25, 1958. The Board of Trade reference is ESB/2862/58.

*From Formosa:*

18 turnouts No. 16, 37 kg. rail, 8 sets right turn, 10 sets left turn
18 turnouts No. 12, 37 kg. rail.

The issuing authority and address to which bids should be sent is the Central Trust of China, Purchasing Department, 68, Yen Ping Nan Road, Taipei, Taiwan, Formosa. The tender No. is 84-33-427-9-70388. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is March 3, 1958. The Board of Trade reference is ESB/3067/58/I.C.A.

Further details regarding the above tenders, together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1).

The Special Register Information Service, Export Services Branch, Board of Trade, reports that General C. R. Seriroengrithi, General Manager, State Railways of Siam (Thialand), has announced that it is planned to operate three additional routes; Thonburi-Rajburi; Bangkok-Saraburi; Bangkok-Lopburi. It is intended to use diesel railcars with a total seating capacity for 180 passengers. It is understood that new diesel railcars will be required, but the exact number will depend on the money available. Tenders will be issued by the State Railways when it is known what sum can be made available for this project. In the meantime United Kingdom manufacturers are invited to send copies of their literature to the State Railways of Siam (Thailand), Noppawongse Bridge, Bangkok.

The Special Register Information Service, Export Services Branch, Board of Trade, reports that the closing date of the call for tenders for 9,392 wheelsets for wagon stock for India, reported on page 56 of our January 10 issue, has been postponed to March 8, 1958.

# Notes and News

**British Insulated Callender's Construction Co Ltd. Glasgow Office.**—British Insulated Callender's Construction Co. Ltd. announce that the address of its Glasgow Office is now 110A, Maxwell Avenue, Westerton, Bearsden, Glasgow. The new telephone numbers are: Bearsden 2382-3.

**Re-nationalisation of Road Haulage.**—Mr. R. Morton Mitchell, Chief Executive Officer of the Road Haulage Association, stated last week that the Labour Party threat of re-nationalisation, although apparently limited to long-distance road haulage, would not only affect every road haulier but would also restrict the trader's freedom of choice of transport and his freedom to operate his own vehicles under "C"-licence. He was speaking at the annual dinner of the Southend Sub-Area of the Association. He added that the "compromise de-nationalisation" carried through by the Conservative Government was thought to establish some stability in the road haulage industry, which must not be disturbed.

**Institution of Locomotive Engineers: Visit to Westinghouse Works.**—A meeting of the members of the Institution of Locomotive Engineers will be held at the Chippenham Works of Westinghouse Brake & Signal Co. Ltd., on March 28, by kind invitation of the chairman and directors of the company. The tour of the works will include the mechanised iron foundry, machine shop, welding shops, plastic moulding, electroplating, and the assembly and test shops where a great variety of brake apparatus, signalling, rectifiers, and colliery plant will be on view. Demonstrations will include the latest type of rectifiers applicable to railway traction, of power signalling on test, and of electronic and remote control methods of railway signalling.

**New Ganz Diesel Trains in Hungary.**—A four-coach diesel train built by Ganz, of Budapest, is to be placed in service shortly on the Hungarian State Railways. The set is powered by two 450-h.p. motors. The maximum speed is 75 m.p.h. A new type of air-cushioned axlebox is stated to be fitted. A restaurant car and buffet are included. On entering service the train will run between Budapest and Nagykanizsa, 136 miles. In the summer months it will work between the capital and Keszthely, the holiday resort, at the western end of Lake Balaton.

**Professional Engineers Appointments Bureau Change of Address.**—As from February 17, the address of the Professional Engineers Appointments Bureau will be 39, Victoria Street, London, S.W.1. The telephone no., which remains unchanged, is Abbey 1737.

**Oxford Readership in Transport Economics.**—Oxford University Congregation last Tuesday gave formal approval to the statute accepting the offer by the Institute of Transport to endow a permanent readership in economics and organisation of transport. Reference to the readership and associated fellowships was made in last week's issue.

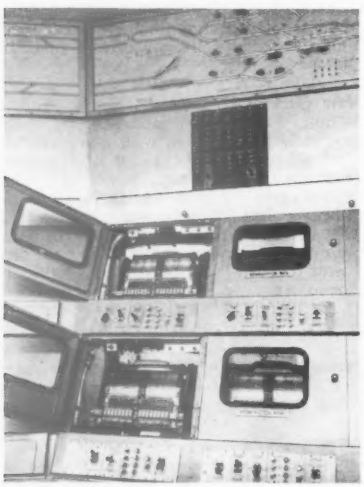
**New Ticket Offices at Euston.**—Euston Station, London Midland Region, is to have new ticket offices with more booking windows and ticket issuing and printing machines. Preliminary work will begin on February 17 with the removal of the railway police office to new premises. This will be followed by conversion of the present police office in the forecourt into a post office. The post office will then be moved from its position at the west side of the booking hall and make possible reconstruction as mechanised ticket offices.

**Permali Glass Fibre Sheet Development.**—One of the largest presses in Britain devoted exclusively to producing glass fibre flat sheet is now in operation at the Permaglass Division of Permali Limited, Gloucester. It is a multi-daylight unit with automatic temperature control and high pressure hot water-heated platens working at a pressure of 4,500 lb. per sq. in. The standard sheet produced measures 70 in. × 34 in., in thicknesses from ⅛-in. More than 30 different grades using phenolic, melamine, polyester or epoxy resins combined with one of several different forms of glass cloth can be pressed to suit almost any particular application; although the six basic grades

*Four-coach diesel set with restaurant car and buffet and two 450-h.p. motors, built by Ganz for the Hungarian State Railways*

manufactured cover most normal requirements. These include: polyester/fine or coarse weave (general electrical and mechanical); epoxy/fine weave or coarse weave (improved electrical and mechanical); melamine/fine weave (non-inflammable electrical to Def. 5000).

**Automatic Junction Working at Kennington, L.T.E.**—Reference was made in our issues of December 13, 1957, and January 17 to the introduction on the Northern Line of London Transport at Kennington of automatic junction working by means of "programme machines" in conjunction with an overriding control by a supervisor at Leicester Square. The accompanying illustration shows that portion of the control panel at Leicester Square which



*Part of control panel at Leicester Square relating to junction at Kennington, showing duplicate programme machines*

relates to Kennington. Space is left to install later in the year the equipment required to deal similarly with Euston and Camden Town. Duplicate programme machines—"time" and "sequence"—are provided, with an illuminated diagram of the Kennington layout, route control button, switches for putting a programme machine out of circuit and for dealing with train cancellations, errors in train descriptions and other eventualities.

**Intermit Filtration Equipment.**—All inquiries for railway applications of the Far-Air impingement and Rotonamic filters, and also the filter washing and oiling unit made by Intermit Limited of Birmingham, and referred to in the New Equipment and Processes pages of our January 31 issue, should be sent to Birfield Industries Limited, Railway Division, Stratford House, Stratford Place, London, W.1.

**New Parcels Depot in Glasgow.**—British Railways, Scottish Region, are to concentrate parcels traffic in Glasgow in a new depot on the site of the former Eglinton Street Goods station, with its entrance off Salkeld Street. The handling shed, with two sets of rails, will have ample platform space and wide roadways alongside, all under cover. Electric platform trucks and an electric mobile crane will be provided, also battery charging plant for these. There are at present three separate road fleets on parcels rounds in Glasgow. When the new depot is brought into service, these will be combined. The existing offices at Eglinton Street will be rebuilt. The Central, Buchanan Street, Queen Street, and St. Enoch Stations will require only to deal with mail, newspapers and perishable traffic. The new depot is expected to be opened towards the end of this year.

**British Railways (Western Region) First Aid Movement.**—The British Transport Commission Police (South Western Area) First Aid Competition was held recently at Old Oak Common Hostel. The winning team was Dover, which will represent the South Western Area in the National Competition organised by the St. John Ambulance Association, to be held at the Central Hall, Westminster, on June 4.

**W. E. Sykes Limited New Birmingham Offices.**—The manufacturer of gear cutting and hobbing machines and tools, W. E. Sykes Limited, of Staines, Middlesex, has announced the opening of new offices at Grove House, Sutton New Road, Erdington, Birmingham 24. The telephone no. is Erdington 7491. The company's Midlands representative is now operating from the offices, which are designed to improve the facilities and services available to customers in the area.

**Euston Station Lifts Damaged by Flood Water.**—A water main under the main-line tracks at Euston Station, London Midland Region, burst on February 9, and flooded the booking hall and lift shafts of the London Transport Underground station. The lifts were put out of action, and the station had to be closed to passengers leaving and entering. The station continued working for passengers wishing to inter-change between the City and Charing Cross branches of the Northern Line.

**Fine for Forcing Level Crossing Gate.**—An express was approaching Forteviot level crossing, Scottish Region, when a pedestrian burst open the padlocked gate and walked across the line with several companions. It was stated in court that there might have been a serious accident, but for the crossing keeper quickly releasing the lock on the other gate so that the party could get clear. The man who broke open the gate was fined £2 10s.

**The Railway Club.**—At the annual general meeting of the Railway Club on February 7, Mr. T. S. Lascelles was elected President in succession to Mr. Kenneth Brown, who has retired after 30 years in office. The Hon. Secretary, Mr. B. D. J. Walsh, spoke of the many services which Mr. Brown had rendered to the Club, and on behalf of members presented him with a chiming clock. Mr. Brown will continue to hold office as a trustee of the Club. Mr. H. A. Vallance, who was Hon. Secretary from 1931 to 1949, was appointed a Vice-President. The annual report and accounts showed continued expansion in 1957, a year marked by the removal to the new premises in High Holborn.

**National Savings in Nationalised Industries.**—The National Savings Committee has announced that at the end of September, 1957, 854,122 workers in nationalised industries, the Civil Service and Local Government, were saving regularly through 13,546 savings groups. Group membership and total number of groups (in brackets) for the various nationalised industries include: National Coal Board, 243,318 (1,077); British Railways, including hotels and restaurants, 56,337 (1,946); Road Passenger Transport, 39,162 (356); London Transport, 34,059 (31); Road Haulage, 5,335 (174).

**International Railways of Central America.**—The directors of International Railways of Central America have taken no action in respect of a dividend on the 5 per cent cumulative preferred stock. This is because the many present uncertainties affecting the company's operations, especially in Guatemala, appear to require maintenance of as strong a cash position as possible.

**English Electric Stand at Electrical Exhibition.**—Products of 14 of the company's departments will be shown by the English Electric Co. Ltd. at its stand at the Electrical Engineers Exhibition; this will be held at Earls Court, London, on March 25-29. Exhibits and photographic displays will cover motors, transformers, fusegear, switchgear, rectifiers, welding equipment, meters, relays, instruments, electronic equipment, and electrical plant of various types.

**British Transport Waterways Purchase of Severn Lighterage Company.**—British Transport Waterways have purchased the business and goodwill of B. & M. Cooke (Gloucester) Limited, a lighterage company operating on the River Severn and the Gloucester & Sharpness Canal. By this acquisition and construction of new craft, British Transport Waterways will have a total carrying fleet of 40 vessels on these waterways, enabling a more economic and more flexible use of craft which should greatly improve the carrying facilities. The latter will be further improved when the £1 million programme of development for the Gloucester & Sharpness Canal and the River Severn is completed.

**Radio Telephones on N.E. Region Delivery Vehicles.**—After a successful test in the use of radio telephony, British Railways, North Eastern Region, have installed radio telephone apparatus at the Newcastle Forth Goods Depot and in six of the depot C. & D. vehicles. The purpose is to carry out an experiment on a larger scale. During the working day, as traders' requirements become known at the depot, messages can be passed direct to the drivers of vehicles working in the vicinity of any particular firm or firms. This is a means of giving quicker service to the public and should prove of particular benefit to traders with urgent traffic which they require to be picked up from their works at short notice.

**Formation of Yorkshire Imperial Metals Limited.**—The formation of a new company, Yorkshire Imperial Metals Limited, represents the fusion of the copper and alloy tube, fittings and plate activities of the Yorkshire Copper Works Limited, and of Imperial Chemical Industries Limited. The company disposes of assets worth about £18,000,000 including the former I.C.I. plants at Kirkby, Smethwick, Landore, and Dundee, and the former Yorkshire Copper plants at Leeds, Barrhead and Castleford. The registered office of the company is at Haigh Park Road, Leeds. The Board of Directors has been constituted as follows:—From I.C.I.: Dr. J. Taylor (Chairman), Mr. P. T. Menzies, Dr. M. Cook, Messrs. M. J. S. Clapham,

St. J. Elstub, H. Royle, and W. N. Ismay. From Yorkshire Copper: Messrs. G. P. Norton (Deputy Chairman), H. F. Sherbourne (managing), W. R. D. Macdonald, C. G. Robinson, D. Fraser, J. Christie, and C. Breckon. The company Secretary is Mr. P. D. Peel Yates.

**Hay's Wharf Results.**—The annual report of the Proprietors of Hay's Wharf Limited will state that providing no further heavy cost increases arise, and assuming no serious recession in overseas trade, the company should be able to maintain its present dividend. The group net profit for the year ended September 30, 1957, after tax, was £292,346, compared with £196,669 for the previous year. £20,730 (£50,000) was put to the capital reserve, and £63,749 (nil) to the general reserve. The ordinary dividend already announced is 8 per cent on capital increased by one-for-two free scrip issue (10 per cent on old capital). Fixed assets are £4,355,401 (£3,895,454).

**British Standard for Seam Welding in Mild Steel.**—A British Standard specifying general requirements for seam welding components made from mild steel sheet and strip under normal conditions of manufacture and service has been issued. The standard (B.S. 2937:1957) does not deal with mash welding. It sets an upper limit of 0·32 in. (8·0 mm.) to the total added thickness of the components to be welded. Among the requirements dealt with are those for parent metal, edge conditions and form of components, the types of electrode to be used, and routine tests and inspection. Appendices provide notes on welding plant beside recommendations for minimum welding pressures; the pressures are related to sheet thicknesses, tread width and mean wheel diameters. Copies, price 4s. 6d., are obtainable from British Standards House, 2, Park Street, London, W.1.

**Presentation to Major-General G. N. Russell.**—To mark the 10th anniversary of the inception of British Road Services, past and present members of the B.R.S. Board of Management on February 3 made a presentation at the headquarters at 222, Marylebone Road, N.W.1, to Major-General G. N. Russell, Chairman of the Board and General Manager of British Road Services. The accompanying illustration shows (left to right): Messrs. H. T. Dutfield, G. Cardwell, A. Henderson, Major-General G. N. Russell. Messrs. C. Barrington, H. E. Clay, G. W. Quick Smith, J. B. Garrett, P. J. R. Tapp, W. Beckett, and G. F. Sinclair.

**Consolidated Signal Co. Ltd. Increased Dividend.**—An ordinary dividend of 40 per cent is announced by the Consolidated Signal Co. Ltd. for the year ended September 30, 1957. This compares with a dividend of 34 per cent for the previous year. Net profits were £45,213 (£40,631). After allowing for dividends, the balance carried forward is £19,058 (£15,861). The meeting will be held on March 3.

**Central Wagon Co. Ltd. Results.**—The group profit of the Central Wagon Co. Ltd. expanded sharply from £375,793 to £503,028 in the year ended September 30, 1957. After allowing for depreciation of £29,625 (£26,396) and taxation £249,110 (£192,288), the net profit was lifted from £157,109 to £224,293. The dividend on the £750,000 capital is maintained at 15 per cent, with an unchanged final dividend of 10 per cent.

**Lee Guinness Exhibits at the Electrical Engineers (A.S.E.E.) Exhibition, Earls Court, London.**—Lee Guinness Limited will show for the first time, at the A.S.E.E. Exhibition, to be held March 25-29, a new range of automatic a.c. motor control gear. This has been designed to comply with all relevant British Standards. All the starters incorporate contactors, thermal overload relays and auxiliary relays designed by A.S.E.A. of Sweden and Voigt & Haeffner of Germany, with which Lee Guinness has agreements for technical liaison. The exhibits will include a representative selection of automatic starters from the Lee Guinness standard range up to 250 h.p.

**B.T.H. Exhibits at Electrical Engineers Exhibition.**—The range of equipment made by the company, which will be represented as the British Thomson-Houston Co. Ltd. stand at the Electrical Engineers (A.S.E.E.) Exhibition, will include motors, control gear, switch gear, germanium rectifiers, and electronic apparatus. Electric motors will include the manufacturer's Type KNC with class "F" insulation; a "Stayrite" single-phase power drive comprising a robust motor with a push-button contactor-type starter; sectional models of various types of industrial motors; and several new models of f.h.p. motors showing the design of the components. The Exhibition will be held at Earls Court, London, S.W.5, on March 25-29.

**George Cohen Buys Crossley Machine Tool Plant.**—It is announced that George Cohen Sons & Co. Ltd. have purchased the whole of the machine tool plant formerly installed at the Stockport works of Crossley Motors Limited. The equipment has become available following the decision of Associated Commercial Vehicles Limited to close down the Crossley Motors works.

**New Haven Passenger Services.**—Considerable reductions were made by the New York, New Haven & Hartford Railroad in its main-line train services from the beginning of this year. They include five workings daily each way between New York and Boston. The lightweight trains of various types which the New Haven has had under test for some months have not met with the success anticipated.

**Heavier Rails in Israel.**—To increase the speed and safety of trains hauled by diesel locomotives, on the whole of the line from Haifa to Tel Aviv Central, the 75-lb. rails have been replaced by 100-lb. rails, allowing the speed of passenger trains to be increased to 62 m.p.h. The average speed of freight trains has increased from 14 to 16 m.p.h. Rails have also been replaced on the Lydda-Jerusalem line.

**British Railways Regional Boundaries.**—In our condensation of the official tabulation of further adjustments of British Railways Regional boundaries as from February 1 (see last week's issue, page 159), items 17 and 18 apeared to conflict. The transfer from Western Region to London Midland Region comprises Marylebone to Northolt Junction exclusive, and Neasden to Harrow South. These were formerly in the Eastern Operating Area and have been transferred to the London Midland Region for all purposes. The only transfer in this section from Western to Eastern Region is the Marylebone C. M. & E. E. electrical repair shop. In regard to items 6, 7, and 8, the transfer was shown in reverse order in error; the transfer is from Southern Region to Western Region.

**Cleveland Bridge & Engineering Co. Ltd. Report.**—The annual general meeting of the Cleveland Bridge & Engineering Co. Ltd. was held on January 13. The chairman of the company, Mr. J. R. Dixon, reported a successful working for the past year. The volume of work carried out, he stated, had increased and a larger turnover was anticipated for the year ending September, 1958. The profit for the year was £77,000 against £32,000 for the previous year. As had been expected, the company had suffered considerable losses in Australia and the reserve account had been built up with these losses in view, out of profits in the years 1953 and 1955; £100,000 has been taken from this account this year for a further write-off, and this reserve continued to be built up by transferring a further £50,000 from the current year's profits. Good progress was being made with bridgework for the Southern Region, British Railways, mentioned in last year's report. The company was working at site on 9 of the 16 bridges in the Region; site work on the remainder would start during the next few months.

*Presentation to Major-General G. N. Russell to mark the 10th anniversary of the inception of British Road Services*

## Forthcoming Meetings

February 14 (*Fri.*).—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, London, N.W.1, at 7.15 p.m. Paper on "Early Bagnall locomotives," illustrated by lantern slides, by Mr. W. A. Smyth, Managing Director, W. G. Bagnall Limited.

February 17 (*Mon.*).—Permanent Way Institution, at the Headquarters of the British Transport Commission, 222, Marylebone Road, London, N.W.1, at 6.30 p.m. Paper, illustrated by lantern slides, "Where do we go from here?" by Mr. K. Brinsmead.

February 17 (*Mon.*).—Railway Correspondence Travel Society, Northampton Branch, at the Liberal Club, Castelian Street, Northampton, at 7.30 p.m. British Railways film show.

February 18 (*Tue.*).—Institute of Transport, Humberside Section, at the Chamber of Commerce & Shipping, Hull, at 7.30 p.m. Paper on "European transport," by Mr. C. F. Klapper.

February 19 (*Wed.*).—British Railways, Southern Region, Lecture and Debating Society, at the Chapter House, St. Thomas' Street, London, S.E.1, at 6 p.m. "Further reminiscences of an artist," by Mr. Terence Cuneo, introduced by Mr. F. D. Y. Faulkner, Public Relations and Publicity Officer.

February 19 (*Wed.*).—Railway Students' Association, at the London School of Economics and Political Science, Houghton Street, London, W.C.2, at 6.15 p.m. Paper on "Consulting the passenger," by Mr. R. M. Robbins, Secretary and Chief Public Relations Officer, London Transport Executive.

February 20 (*Thu.*).—British Railways, Western Region, London Lecture & Debating Society, at Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m. Paper on "Selling transport in the new railway age," by Mr. S. C. Harvey, Assistant to Chief Commercial Manager (Sales).

February 20 (*Thu.*).—Diesel Engineers & Users Association, at Caxton Hall, Westminster, S.W.1, at 2.30 p.m. Paper on "Engine evolution: non-marine engines over a quarter of a century," by Mr. D. S. D. Williams.

February 21 (*Fri.*).—Institute of Transport, Tees-side Section, at the Cleveland Scientific & Technical Institution, Middlesbrough, at 7 p.m. Debate: "That the transport facilities on Tees-side are not keeping pace with the development of the area."

February 21 (*Fri.*).—Railway Correspondence & Travel Society, Lancs. & North West Branch, at the D.O.S. Conference Room, Preston Station, at 7 p.m. Paper on "Signalling and traffic," by District Inspector R. Redmond.

February 22 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Norwich at 2.15 p.m. Paper on "Modernisation," illustrated by lantern slides, by Mr. D. R. Dalmeyer.

February 24 (*Mon.*).—Stephenson Locomotive Society, Midland Area, at the Birmingham Exchange & Engineering Centre, Stephenson Place, Birmingham, at 7.15 p.m. Paper on "The North Eastern Region of British Railways," by Mr. R. A. Savill.

February 25 (*Tue.*).—Stephenson Locomotive Society, Midland Area, and the Railway Correspondence & Travel Society, West Midlands Branch, at 64, Holyhead Road, Coventry, at 7.30 p.m. Lantern slide and colour transparency show: "The railways of Finland and Northern Europe," by Mr. L. R. Aguttar.

February 25 (*Tue.*).—Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.G. Guild Room, Toll Street, Nottingham, at 7.30 p.m. Paper on "11 Passengers per second—the G.E.R. suburban services," by Dr. R. F. Youell, President, Leeds University Railway Society.

February 26 (*Wed.*).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, S.W.1, at 5.30 p.m. The Sir Seymour Biscoe Tritton Lecture by Mr. E. Upmark, Director General, Swedish State Railways: "Development of electric traction in Sweden and its influence on rolling stock."

February 27 (*Thu.*).—Institution of Mechanical Engineers, at 1, Birdcage Walk, Westminster, S.W.1, at 6 p.m. Discussion: "Are we satisfied with the quality of fuel at present available for high-speed diesel engines?"

February 27 (*Thu.*).—British Railways, Southern Region, Lecture & Debating Society, at the Golden Arrow Club at Orpington, at 6 p.m. A selection of interesting films from the Transport Film Library.

February 28 (*Fri.*).—Institution of Railway Signal Engineers, Bristol Section, in the Meeting Room, above main booking hall, Temple Meads Station, at 6 p.m. Paper on "Train describers," by Mr. M. E. Reach.

## Railway Stock Market

Apart from activity in British Funds, stock markets have not fulfilled the promise of a better trend. Recent gains in the industrial section were barely maintained, partly because of less confidence in an early reduction in the bank rate, though the belief that sooner or later a cut in the rate is inevitable was the main factor behind the activity in British Funds. There is wider recognition in the City that the outlook, and perhaps the question of a bank rate cut in the very near future, may depend on the indications of the recession in the U.S.A. continuing for some months. A further slowing down of trade in America would make it still more difficult for Britain to earn dollars from export business. Nevertheless, despite the many uncertain factors, which explain why buyers are still showing much caution, selling is very moderate compared with a few weeks ago. It is being suggested that many industrial shares are at levels which more than allow for the possibility of a fair number of dividend reductions; and that, in the circumstances, there is scope for a big recovery in share values as time proceeds.

The latest set-back on Wall Street kept Canadian Pacifics subdued at $47\frac{1}{2}$, at which there is a yield of almost $5\frac{1}{8}$ per cent. or well in excess of yields on many other active dollar stocks. Canadian Pacific preference stock remained at $54\frac{1}{2}$, while the 4 per cent. debentures strengthened fractionally to $65\frac{1}{2}$. Elsewhere, White Pass shares have been firmer at $\$14\frac{1}{2}$.

United of Havana second income stock has receded further from $6\frac{1}{2}$ to 6 in the absence of demand and the consolidated stock was $1\frac{1}{4}$. San Paulo Railway 3s. units have remained at 2s. $1\frac{1}{2}$d. and Mexican Central "A" bearer debentures showed steadiness at 67.

Brazil Railway bonds were again $5\frac{1}{2}$. In other directions, Costa Rica ordinary stock changed hands at 17 and the first debentures have marked 71. Antofagasta ordinary stock has strengthened on the week from $16\frac{1}{2}$ to 17 and the preference stock from 34 to 37.

Among shares of locomotive builders and equipment companies, Westinghouse Brake continued under the influence of the chairman's annual statement, and at 36s. 3d. more than held their recent good advance. Beyer Peacock 5s. shares kept at 8s. at which there is a yield of nearly $9\frac{3}{4}$ on the basis of last year's 16 per cent. dividend. Wagon Repairs 5s. shares eased slightly to 13s. 3d. and Gloucester Wagon 10s. shares were also 13s. 3d., while G. D. Peters shares, which were as firmly held as usual, were quoted at 27s. 6d. Charles Roberts 5s. shares have been maintained at 8s. At Glasgow, Hurst Nelson at 26s. were virtually the same as a wek ago. North British Locomotive have been a little firmer at 12s. 3d. and Birmingham Wagon were 17s. 3d. Among other shares, Thomas De La Rue 5s. shares changed hands around 23s. $1\frac{1}{2}$d., B.S.A. were 25s. 6d., while John Bull Rubber 5s. shares have risen sharply to 15s. $7\frac{1}{2}$d., awaiting news of the terms of the take-over offer which has been announced by the directors. In other directions, Tube Investments firmed up to 51s.

Associated Electrical strengthened from 48s. 3d. to 48s. 6d., but General Electric eased further to 32s. and at 46s. 3d. English Electric did not keep best prices. British Oxygen were firmer at 30s., as were British Timken at 46s. 3d.

## OFFICIAL NOTICES

RAILWAY COMPANY (British), operating Chile and Bolivia, requires: (1) ASSISTANT RUNNING SUPERINTENDENT, (2) ASSISTANT TO TRAFFIC MANAGER. Candidates with knowledge of Spanish or overseas railway experience would have preference. Sterling salary, allowances, retirement benefits, free quarters, passages, home leave, etc.—Write to Box No. 1491, c/o Charles Barker & Sons Ltd., Gateway House, London, E.C.4.

LONDON TRANSPORT require a number of CIVIL ENGINEERS in connection with their New Works Programme; preferably with a University Degree or Graduate Membership of a recognised professional Institution. Applicants must have had experience in preparation of schemes, estimates, civil engineering design, contract drawings and documents and be capable of controlling staff and supervising works executed by contract. They must have had experience in some of the following types of civil engineering work—earthworks, drainage, bridging, retaining walls, heavy foundations, R.C. works, tunnelling, general railway construction. Salary range according to ability, qualifications and experience, from £790 to £1,155. Medical examination; free travel.—Applications within 7 days to Staff and Welfare Officer (F/EV 668), London Transport, 55 Broadway, S.W.1.

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